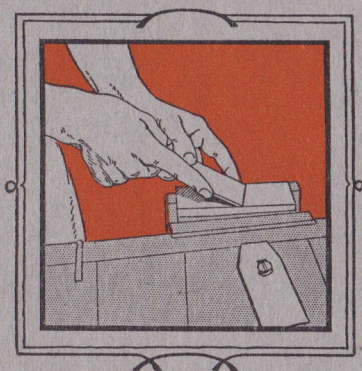


Advice on
**HOW TO SHARPEN
WOOD-WORKING
TOOLS**



PUBLISHED BY
THE CARBORUNDUM COMPANY
REG. U. S. PAT. OFF.
NIAGARA FALLS, N. Y., U. S. A.
CANADIAN CARBORUNDUM CO., LTD.
NIAGARA FALLS, ONT.

Advice on
**HOW TO SHARPEN
WOOD - WORKING
TOOLS**

BY EMANUEL E. ERICSON



PUBLISHED BY
THE CARBORUNDUM COMPANY
REG. U.S. PAT. OFF.
NIAGARA FALLS, N. Y., U. S. A.

SOME ADVICE ON HOW TO



VERY experienced mechanic knows the value of sharp tools. The poor workman and the amateur may need to be told that to lose some time from work while sharpening tools means to gain it back many times over in good workmanship and speed of production. But the good worker has already learned this fact.

With greatly increased pay to woodworkers, as well as other craftsmen in the past decade and with correspondingly increased demands for rapid production, the problem of how much time may be spent in keeping tools in order has become an important one. And with this condition has come the need on the part of the worker for two things: (1) the best and most reliable kinds of tools obtainable, and (2) the fastest, cleanest cutting sharpening stones for his tools.

Time was when the woodworker could take the plane iron out of the plane, fill his pipe and have a smoke while he leisurely put an edge to his tool on a natural, slow-cutting stone. Only one kind of grit was available in one stone. It was either too fine for fast cutting or too coarse for the finishing edge. Now a person can have fast-cutting stones better than "those that nature made"; stones of the most suitable quality for his work. The combination stone deserves its great popularity, for with it the worker gets the benefit of two separate stones.

There are now stones available for all purposes and of all desirable degrees of coarseness. The mechanic who values his time and who takes pride in his work will have in his kit a sufficient assortment of modern sharpening stones to take care of all of his needs in the least possible time, and that will, at the same time,

SHARPEN WOOD-WORKING TOOLS

put upon his tools the kind of cutting-edge that is a pride to every skilled woodworker.

In the tool kit of the average home owner who does a limited amount of mechanical work, there is often a deplorable absence of effective tool-sharpening facilities. The fact that a person works on mechanical jobs now and then only should not be sufficient reason why he should work with dull tools. Tradition has allotted the poor and dull tools to the learner and less expert workman. Such custom was probably started in the time when putting tools in shape was a greater job than under modern conditions and with modern facilities.

“Sharp tools in less time through correct methods and the proper stone,” should be the slogan of every woodworker. In the following pages will be told and illustrated useful methods employed in the sharpening of various wood-working tools.

In order that one may obtain the best results in grinding and sharpening tools there are a few things about the stone and its action upon steel that should be known to every one. In the first place it should be known that when selecting a stone for fast cutting, it is not alone the coarseness or fineness that is the determining factor. All coarse stones are not of necessity rapid cutting. It is the sharpness of the grit that counts.

A dirty stone cannot cut. Oil must always be used on the stone to prevent particles of steel and dirt from filling the pores of the stone. A mixture of machine oil and kerosene in about equal proportions works well on most stones. If a stone has become clogged up with foreign substance it can be renovated by being heated in an oven or over a fire. When a stone is so treated it should be placed in a pan, for a surprising amount of

SOME ADVICE ON HOW TO

oil and dirt will come out of it, even if it seems dry before being subjected to the heat. It is well to wipe the stone dry while it is hot. After this treatment it should cut practically as well as a new one; and, if given a sufficient amount of oil, last almost indefinitely.

SHARPENING PLANE-IRONS AND CHISELS

Of all tools that are used by the woodworker, the plane probably comes first in importance both from the standpoint of frequency of its use and because of the great need for accuracy in the work it does. The sharpening of the plane-iron, consequently, demands the best attention and the closest study on the part of the worker; for it must be remembered that the work turned out will reflect the condition of the plane.

No two experienced workers would probably go through exactly the same motions in sharpening a plane-iron or a chisel. However, the following directions will, if they are followed carefully, go far toward producing a true, sharp-cutting edge. The directions given for the treatment of the plane-iron and the photographs shown in connection with it will apply so closely to the sharpening of the chisel that it will be unnecessary to go into extended discussion with reference to the latter.

For the convenience of the reader the different steps or operations in sharpening these tools will be numbered. In this way they can be referred to in a more convenient manner.

1—The first thing to do after a very dull plane-iron has been removed from the plane is to test it for squareness as shown in Fig. 1. In most cases such a test will determine a need for lining and squaring the cutting edge.

SHARPEN WOOD-WORKING TOOLS

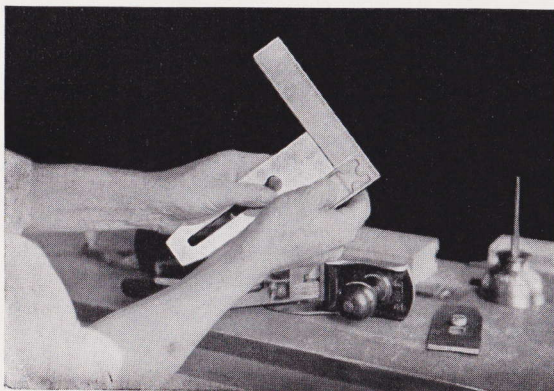


Fig. 1

Testing the
Plane-Iron for
Squareness

2—The plane-iron is squared by grinding its cutting edge on a medium fine sharpening stone as shown in Fig. 2. It is advisable to do this on the edge of the stone as shown because the flat surface on a used stone is seldom true enough to produce a sufficiently straight edge. The cutting edge of a plane-iron may be slightly curved, depending upon the use of the plane. Particularly is this true of the jackplane.

3—The next problem that must be solved is the angle of the bevel. The angle used for the bevel varies according to the kind of wood to be planed—hard wood requiring a

SOME ADVICE ON HOW TO

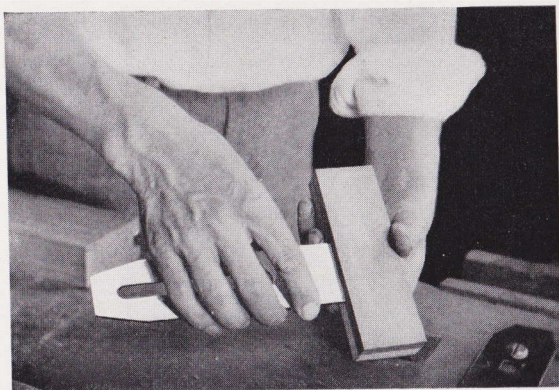


Fig. 2

Squaring the
Plane-Iron on
Sharpening
Stone

thicker bevel than soft wood. A bevel varying from 15 to 20 degrees, according to the hardness of the wood, will prove satisfactory. In order to determine with some degree of exactness just what is the proper angle for grinding, a T-bevel or bevel square may be used. This may be set upon the steel square as shown in Fig. 3. The measures of 5 inches and $2\frac{1}{4}$ inches will set the square for a bevel suitable for ordinary work. If a protractor is available the bevel may be measured by degrees. From 20 to 25 degrees is recommended by most workmen. If the wood to be worked is very hard or full of knots the

SHARPEN WOOD-WORKING TOOLS

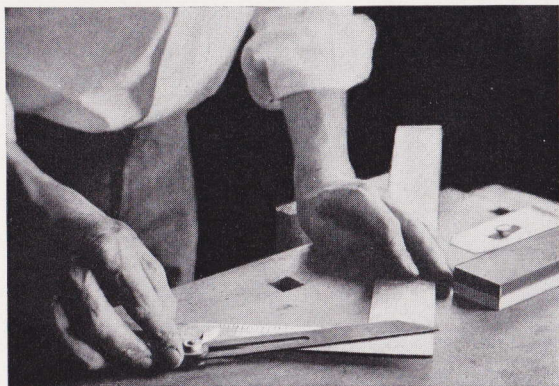


Fig. 3

Figuring
Proper Angle
for Grinding

angle of the cutting edge should be slightly increased. It should be kept in mind that the thinner the edge the easier the labor in planing, provided, of course, it is not too thin to "stand up."

After the slant of the bevel has been determined, the square is applied to the plane-iron. This is done before the process of grinding is begun and repeated later to check while the grinding is being done, particularly if the plane-iron is held on the grinding wheel without a special clamp.

Mechanics with much experience would probably omit the use of the bevel square

SOME ADVICE ON HOW TO

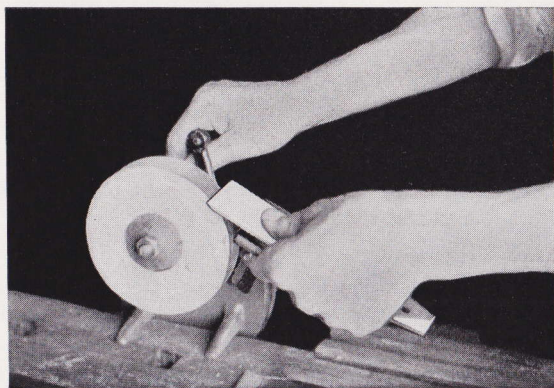


Fig. 4

Grinding the
Plane-Iron on
Hand Grinder
equipped with
Carborundum
Brand Wheel

and rely on their trained eye for a correct bevel, but for the less experienced the procedure described here is recommended.

4—The grinding is the next operation. This can be done on a variety of grinding machines ranging all the way from the old-fashioned grindstone to the modern oil grinder which has a special clamp and carriage for holding the tools at the proper angle. The grindstone is largely a thing of the past and the small hand-grinding outfit fitted with a modern grinding wheel, shown in Fig. 4, has taken its place; because its wheel is faster cutting, the grinder takes

SHARPEN WOOD-WORKING TOOLS

less room, and can be transported as a regular part of a person's tool equipment. In selecting such a grinder great care should be taken to get a wheel of the quality that cuts rapidly with a minimum production of heat.

A grinder of the type shown in the photograph has a small tool rest which can be adjusted to the bevel required. If the bevel-square has been set for the angle, it can profitably be used to determine the position of the tool rest.

When grinding, the plane-iron is held in the left hand while the crank is turned with the right. The plane-iron is gradually moved from side to side in order that the cutting edge may be smooth and straight, and a light pressure is used to keep the tool from heating. The cutting edge of a tool can very easily be overheated and not much heat is required for rendering the edge useless for further service.

Continue the grinding until the dull edge produced by the cross-grinding is entirely eliminated; but take care not to go too far beyond this point. By close examination one can determine when this edge is disappearing. The pressure should be reduced and a fine "burr" or wire edge may be allowed to appear. If too coarse a wire edge is produced, the edge will be rough and very difficult to finish properly.

5—A plane-iron is not ready for use when it leaves the grinder, although some less particular persons seem to think so. It must be sharpened on an oilstone. A fine stone, or the fine side of a combination stone should be used.

It is well to fasten the stone in the vise. Then place upon it a few drops of oil. Do not use the stone dry;

SOME ADVICE ON HOW TO

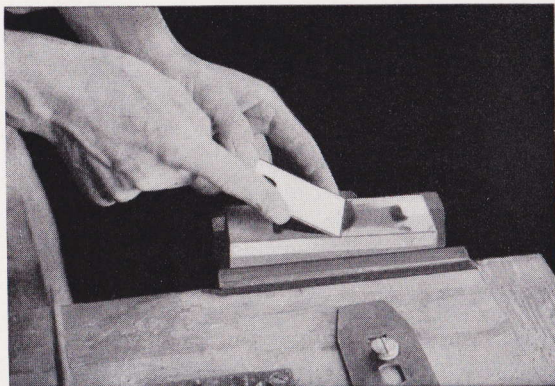


Fig. 5

Giving the
Plane-Iron its
Finished
Smooth Edge

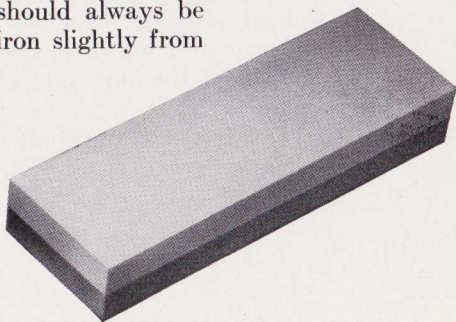
for if this is done the steel that is removed will adhere to the stone which will at once lose its fast-cutting quality—the outstanding characteristic of high-grade manufactured stones.

6—Hold the plane-iron with both hands as indicated in Fig. 5 and move it backward and forward a half-dozen times with the main pressure on the forward stroke. When beginning this operation, place the iron on the stone at a very low angle and raise it gradually until the bevel lies flat on the surface of the stone. Care should always be taken to move the plane-iron slightly from

*These
Carborundum Brand
Combination Stones
are Recommended*

No. 108, 8 x 2 x 1 inches

No. 109, 6 x 2 x 1 inches



SHARPEN WOOD-WORKING TOOLS

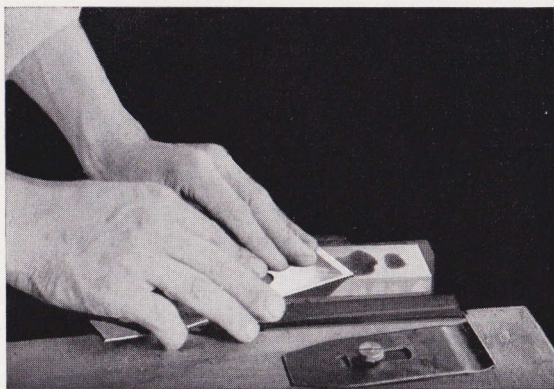


Fig. 6
Finishing
Off the
Edge

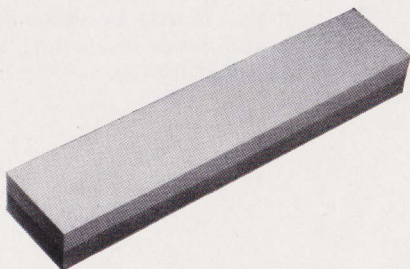
side to side with each stroke, both in order to keep the stone level on the surface and to be sure that all parts of the cutting edge will come in contact with the stone.

7—Now turn the plane-iron over and lay it flat on the stone as shown in Fig. 6. Take a few light strokes, keeping both hands on the top of the iron to avoid the possibility of lifting it up and producing a bevel on its face side. It is necessary to have a stone with a level surface for this operation, or such a bevel is put on by the irregularity of the stone. Just enough work is done here to fold the wire edge in the opposite direction.

*Carborundum Brand
Combination Stones can also
be had in these sizes*

No. 112, 4 x 1 $\frac{3}{4}$ x $\frac{5}{8}$ inches

No. 329, 9 x 3 x 1 $\frac{1}{2}$ inches



SOME ADVICE ON HOW TO

8—Time can now be saved in removing the wire edge by drawing it through a piece of wood. To finish the sharpening, the two preceding operations are again repeated, but with fewer strokes for each, in order to furnish a fine cutting edge.

9—And finally comes the test of the work performed. The bevel is held down and the iron is allowed to rest on the thumb nail by its own weight. If it “bites” it is sharp; if it does not it is useless to put it into the plane. Better start over and stay with it until it passes the final test.

10—A word should be said in regard to replacing the plane-iron after it is sharpened. One mishap at this point will ruin all the good work that has been done. When putting on the plane-iron cap, put it on cross-wise over the plane-iron, then pull it down and away from the cutting edge. Now turn it parallel to the plane-iron and, holding both iron and cap, gradually move the cap up into position without allowing it to come over the cutting edge.

Another danger of nicking the cutting edge appears when the plane-iron is placed into the plane. Care should be taken not to strike the cutting edge against the sides of the plane, etc.

It is not necessary, of course, to go through the entire process of grinding each time the plane-iron loses its edge. It may be taken out and sharpened on the stone a number of times until the edge becomes too thick for satisfactory use.

SHARPEN WOOD-WORKING TOOLS

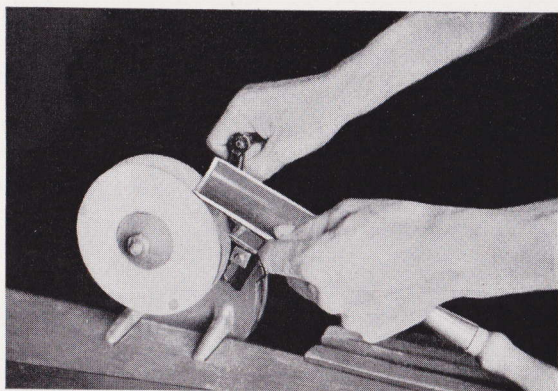


Fig. 7
Grinding
the Gouge on a
Carborundum
Brand Wheel

SHARPENING GOUGES

1—Outside-ground gouges may be ground as shown in Fig. 7. This holds true also for wood-turning gouges. The tool rest is adjusted to suit the bevel required and the gouge is moved from side to side upon the wheel and at the same time made to rotate or roll from one edge to the other.

If the cutting edge is irregular it should first be squared as explained for the plane-iron.

2—Instead of using a flat stone for sharpening after the grinding is done, an oilstone “slip” is used. This stone is wedge-shaped in section and has rounded edges to fit in concave surfaces. It is held in the hand as shown in Fig. 8, and instead of moving the

SOME ADVICE ON HOW TO

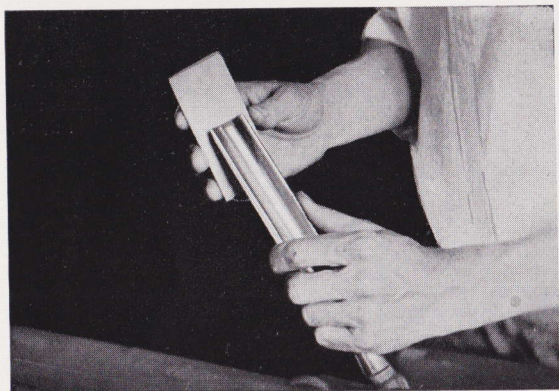


Fig. 8

Using the
Carborundum
Brand
Slip-Stone
for Sharpening
a Gouge

tool over the stone, the stone is moved over the tool, while the gouge is being rotated by the left hand.

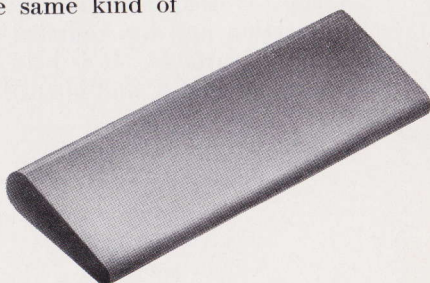
3—A few strokes on the inside as shown in Fig. 9, carefully taken so as not to produce a bevel, followed by the stropping on the hand if desired, gives the finishing touch to this operation.

Inside-ground gouges are ground on a wheel with a rounded edge. The face of the wheel can always be smaller than the diameter of the gouge. In this way one wheel takes care of gouges of several sizes. The sharpening is done with the same kind of

*For this Work these Carborundum
Brand Slip Stones are
Advised. (See Fig. 8)*

No. 154 Extra Hard, Extra Fine,
 $4\frac{1}{2} \times 2\frac{1}{8} \times \frac{5}{8}-\frac{1}{8}$ inches

No. 180 Fine Grit,
 $4\frac{1}{2} \times 2\frac{1}{8} \times \frac{5}{8}-\frac{1}{8}$ inches



SHARPEN WOOD-WORKING TOOLS

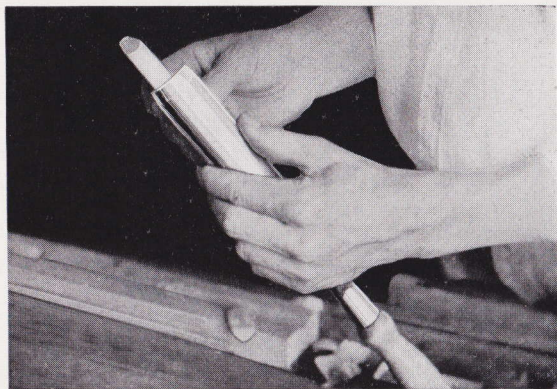


Fig. 9

A Carborundum
Brand
Gouge Stone
is also needed
in the Tool Kit

slip as for the outside-ground gouge, and all directions for the process of grinding and sharpening are practically the same.

THE KNIFE

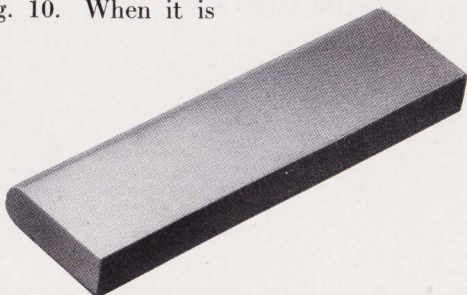
A good combination stone of fast-cutting quality is quite sufficient for keeping ordinary knives in condition and very little grinding on the wheel is necessary. If the knife is quite dull the sharpening should be started on the coarse side of the stone.

The knife, as well as other tools, should be sharpened on the pushing stroke when held as illustrated in Fig. 10. When it is

*We Suggest
the Use of the Following
Carborundum Brand Stones
for Sharpening Gouges*

No. 163 Gouge Stone, Fine Grit,
5 x 1½ x ½ inches

No. 166 Gouge Stone, Medium Grit,
4 x 1½ x ½ inches



SOME ADVICE ON HOW TO



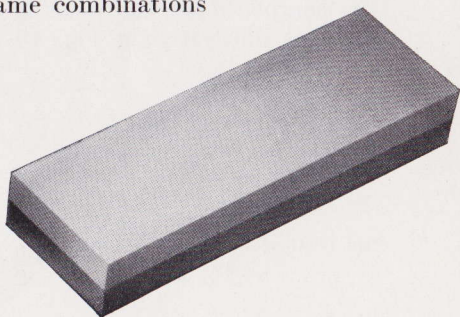
Fig. 10

Getting a Keen
Lasting Edge
on the Knife
with the
Carborundum
Brand
Combination
Stone

turned over the pressure is put on the pulling stroke. Sharpen on the coarse side until there appears a fine burr or wire edge, then work off this wire edge as previously explained. Most people allow knife blades to become too thick at the cutting edge so that they cut with great difficulty. If this condition is remedied, at each sharpening there will be very little extra work to do at a time. For pocket knives and for use away from the tool kit in the workshop there are now available small, nicely shaped stones of the same fine quality and in the same combinations as the larger ones.

*Carborundum Brand
Combination Stones
Recommended for
Sharpening Knives*

No. 110, 7 x 2 x 1 inches
No. 111, 5 x 2 x $\frac{3}{4}$ inches



SHARPEN WOOD-WORKING TOOLS

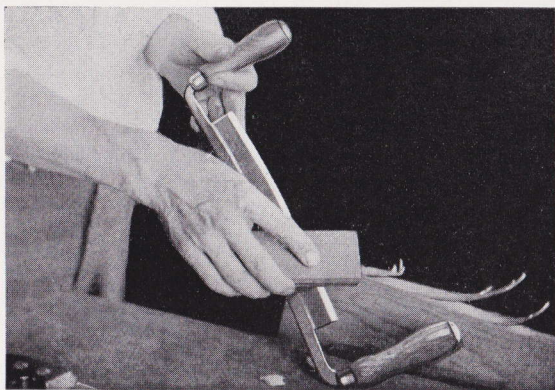


Fig. 11

Extra Large
Size
Carborundum
Brand
Combination
Stones
for this work

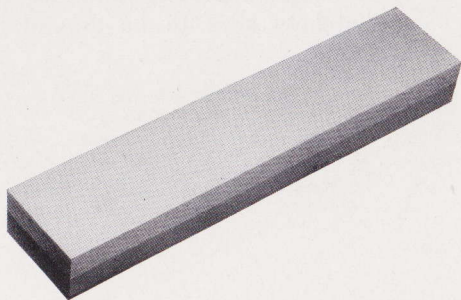
THE DRAW KNIFE

The draw knife may be ground on a small wheel grinder, but it is well to have some assistance in running it so that both hands may be used for holding the knife. It is usually sharpened as shown in Fig. 11, the stone being moved back and forth at an angle across the cutting edge with a gradual movement of the stone from one end of the knife to the other. A combination stone of rather generous proportions is suitable for this, the coarse side first being used if needed.

*Other Sizes
of Carborundum Brand
Combination Stones*

No. 108, 8 x 2 x 1 inches

No. 328, 8 x 3 x 1 inches
(extra wide)



SOME ADVICE ON HOW TO

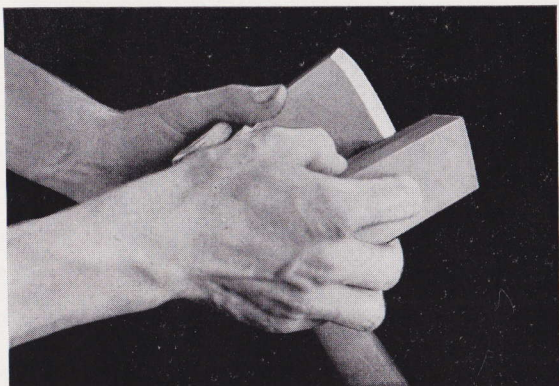


Fig. 12

The
Carborundum
Brand
Combination
Stone
or the Special
Square or Round
Axe Stones
for Axes and
Hatchets

THE HATCHET

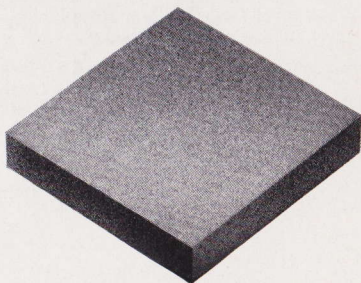
The hatchet, or the lath hatchet, is sharpened in a similar manner to the knife, with the difference that the stone is moved back and forth instead of the tool. In Fig. 12 is shown a combination stone in use for sharpening; while in Fig. 13 is shown the use of a special combination stone circular in shape and especially designed for lathers and shinglers. Because of its shape it can easily be carried in the overalls pocket and thus be available at all times.

Common hatchets and lath and shingling hatchets need to be ground occasionally.

*For Sharpening Hatchets and Axes
You Should Use the Following
Carborundum Brand Axe Stones*

No. 194, $3 \times 1\frac{1}{2} \times \frac{1}{2}$ inches

No. 195, square, $2\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{2}$ inches



SHARPEN WOOD-WORKING TOOLS

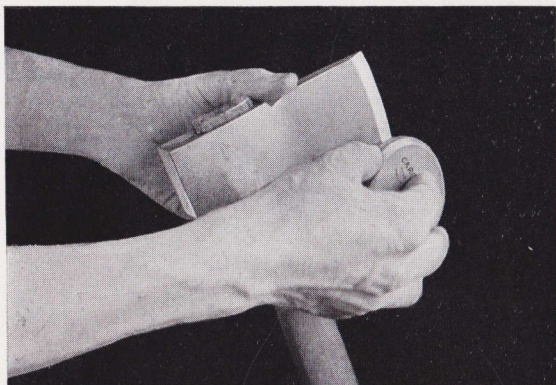


Fig. 13

Using the
Carborundum
Brand Round
Combination
Axe Stone

This can be done on a rapid-cutting hand-grinder and time is thus saved compared with that used in relying upon the sharpening stone alone.

CABINET SCRAPERS AND FLOOR SCRAPERS

Scraper blades of all kinds receive a finer edge if treated with an oilstone. It is best to place the scraper blade in the vise, if it is possible to do so, and cut it to the proper bevel as shown in Fig. 14, using first the coarse side of the combination stone. This will produce a considerable burr on the cutting edge. The fine side of the stone is then

*Here is Another Type of
Carborundum Brand Axe Stone*

No. 196 Round Combination,
3 inches diameter, $\frac{5}{8}$ inch thick



SOME ADVICE ON HOW TO



Fig. 14

Sharpening a
Scraper Knife
with the
Extra Hard,
Extra Fine
Stone

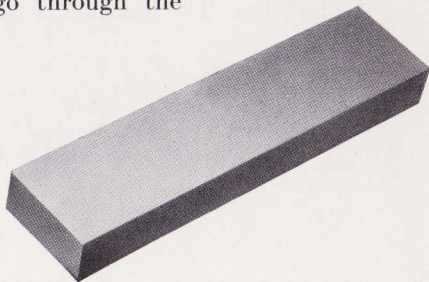
used. The scraper is laid flat on the stone in order to remove the burr and produce a perfectly smooth cutting edge. After this is done, the burnisher is used to fold this edge forward to the proper position for good cutting. Just what position that is will have to be learned largely by experimentation. A word of caution against turning up too coarse an edge may, however, be of value to those with limited experience.

After the scraper has once been sharpened properly with a stone it can be reconditioned a number of times with the burnisher alone before it is necessary to go through the entire process again.

*Every Tool Kit
Should Include one of these
Extra Hard, Extra Fine
Carborundum Brand Stones*

No. 156, 8 x 2 x 1 inches

No. 158, 6 x 2 x 1 inches



SHARPEN WOOD-WORKING TOOLS



Fig. 15

Carborundum
Brand Slip Stones
for keeping
Carving Tools
right

Cabinet scrapers with square edges are worked first with the coarse side at a slight angle to the blade; then the flat sides are touched up enough with the fine side to remove the wire edge. After this the burnisher is used to produce the cutting edge.

WOOD-CARVING TOOLS

There are slip stones available for all types of wood-carving tools. The sharpening of these tools does not differ materially from sharpening chisels and gouges. Very fine stones must be used because of the need for a keen edge for this work.

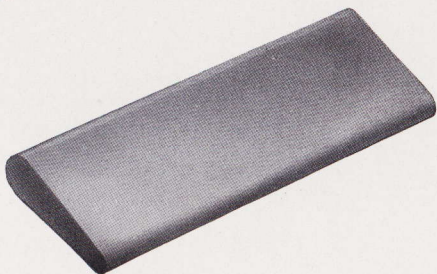
*These Carborundum Brand Slip
Stones are Advised for Sharpening
Carvers' Tools*

No. 155 Slip Stone,

$4\frac{1}{2} \times 1\frac{3}{4} \times \frac{1}{2}$ - $\frac{1}{16}$ extra hard, extra fine

No. 183 Slip Stone,

$4\frac{1}{2} \times 1\frac{3}{4} \times \frac{1}{2}$ - $\frac{1}{16}$ fine grit



SOME ADVICE ON HOW TO

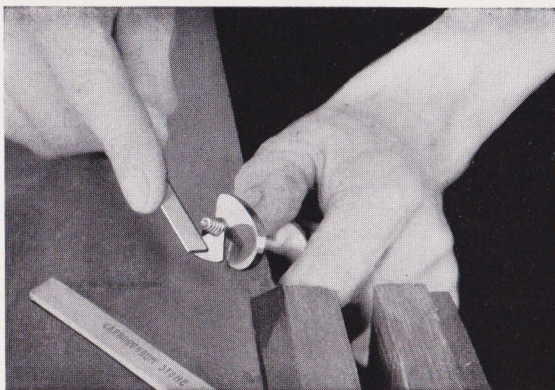


Fig. 16
Special Shaped
Carborundum
Brand Sticks
useful for
Sharpening
Auger Bits

UNIVERSAL PLANE BITS

Universal plane bits or cutters need to be kept in good shape and should not be allowed to become dull or rusty. Very small slip stones are available that will fit even the smallest bead. The method of sharpening as shown in Fig. 15 is like that of sharpening gouges.

AUGER BITS

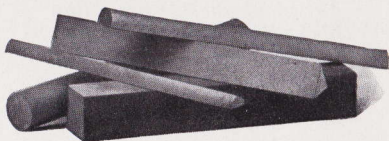
A fine, fast-cutting stone will produce a better cutting edge on auger bits than the file. The stones or sticks used for this purpose are very slender and fine in grit. Auger

You Will Find These Carborundum Brand Sticks Useful

No. 303, 4 x $\frac{1}{2}$ - $\frac{1}{4}$ x $\frac{1}{16}$ inches, fine grit

No. 318, 4 x $\frac{1}{2}$ x $\frac{1}{16}$ - $\frac{3}{32}$ inches, fine grit

No. 319, 4 x $\frac{1}{2}$ x $\frac{3}{16}$ - $\frac{3}{17}$ inches, medium
fine grit



SHARPEN WOOD-WORKING TOOLS

bits should be sharpened on the inside of the nibs, and on the tops of the lips or horizontal cutting edges. Too many persons make the mistake of taking off metal on the outside of the bit, making it crowd in the hole; or sharpening the lips from the under-side, which makes it refuse to feed into the wood.

It is a good plan to hold the bit on the bench as shown in Fig. 16, while using the stone. Smooth forward strokes should be taken, with care not to press too hard upon the delicate stone. When stoning the lips the bit can best be stood upon the speer and the stone moved upward and against the cutting edge.

The Forstner bit is sharpened in a similar way to the auger bit. It requires a stone of extremely small dimensions and a light touch in the application of it.

THE SCREWDRIVER

The screwdriver is a tool that most people neglect. It is used for many different purposes and its point is often in such a shape that no self-respecting screw will allow itself to be driven by it. To save such a situation an oilstone can be brought into use. It takes only a few minutes to reshape the point. The screwdriver must be laid down at a low angle to the stone and care must be taken not to get it too sharp.

GET THE HABIT

Once having acquired the habit of keeping tools sharp a person realizes the advantages that are derived. Mechanics who are "cranky" about their tools usually do good work. An assortment of sharpening stones and a good grinding wheel will go far toward raising the self-respect of the worker in wood and will help to increase the estimate of his neighbors toward his product.

SOME ADVICE ON HOW TO

These Carborundum Brand Sharpening REG. U.S. PAT. OFF. Stones are Especially Recommended for Manual Training School Work



THE proper care and use of edge tools in the manual training or vocational schools is considerable of a problem. Practical methods of sharpening these tools and the use of Carborundum Brand Sharpening Stones which are particularly recommended for school work will certainly go far in the solution of the problem.

In addition to the regular Combination Stones, listed elsewhere in this booklet, every school equipment should include the special Extra Hard, Extra Fine, Manual Training Stone. These stones are made in just the proper grit and in the right grade to give an extra fine delicate edge and at the same time to stand up to the trying conditions of the school shop. These stones cut fast and clean, wear evenly and impart a razor-like edge to chisels, plane bits and similar tools.

The Extra Hard, Extra Fine stones are made in several sizes from 8 x 2 x 1 inches to 6 x 2 x $\frac{5}{8}$ inches.

The Carborundum Brand No. 172 Manual Training Slip Stone should also be included in the school sharpening outfit. This stone is designed for touching up the edges of chisels, curved gouges, fine carving tools, etc. It is also made in the extra hard grade, extra fine grit. One of the features in connection with this stone aside from its ability to cut fast and clean and to give an extra keen, smooth edge, is the convenience provided for caring for the stone. At one end of the stone a hole is drilled so that the stone can be hung up out of the way when not in use.

Another valuable stone for use in school shop work is the special tapered gouge stone made in both Carborundum and Aloxite Brand. This stone is tapered and has a curved, or

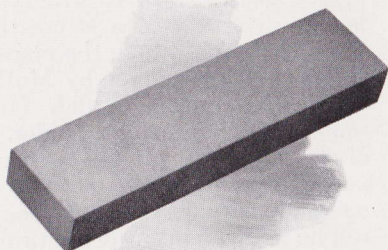
SHARPEN WOOD-WORKING TOOLS

concave inner surface. Note the illustration. It is designed for sharpening gouges and all curved cutting edges and both the inside and outside curved edges of special carving tools, etc. It can also be effectively used in stoning up dies of various kinds.

An assortment of Carborundum Brand Carver Slips as listed and illustrated on page 33 of this booklet as well as several sizes of the regular Combination Stones (page 29) will well complete the sharpening stone outfit of any manual training, trade or vocational school.

THE Carborundum Brand Extra Hard, Extra Fine Stone should be in the tool equipment of all manual training schools. Made in several sizes as follows:

	Each
No. 156—8 x 2 x 1 inches . .	\$1.75
No. 157—8 x 2 x $\frac{3}{4}$ inches . .	1.50
No. 158—6 x 2 x 1 inches . .	1.25
No. 159—6 x 2 x $\frac{5}{8}$ inches . .	1.00



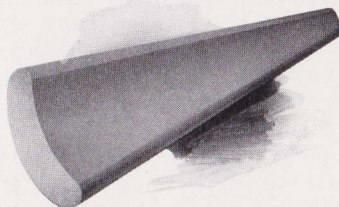
THE special Carborundum Brand Slip Stone extra hard, extra fine is also recommended for manual training work.

	Each
No. 172—4½ x 1¾ x ½-⅜ . .	\$0.85



THE Special concave-convex Aloxite Brand Gouge Stone is recommended for sharpening of all curved edges, etc.

	Each
No. 15—Special Gouge Stone— 6 x 2 x 1 x ⅜-⅙	\$1.50



The Story of Carborundum

(SILICON CARBIDE)

REG. U. S. PAT. OFF.

THE story of "Carborundum" is indeed an industrial romance. It is a romance of fact but it sounds more like the romance of fiction. The story begins with Edward Goodrich Acheson in his little shop in the little town of Monongahela City, Pa., in the year 1891. Dr. Acheson had just completed a series of electrical experiments with Thomas A. Edison and so he became extremely interested in the then mysterious force of electricity. In the course of his research he conceived the idea of creating an abrasive or grinding material that would take the place of emery, corundum and other similar materials made by Mother Nature.

And this is what he did. He took a tiny iron bowl such as plumbers use for melting solder. Into that bowl he put a mixture of clay and coke. In one corner of his little shop he had a little power plant. He ran two wires from his generator, grounded one and twisted the other about a piece of a carbon rod. This rod he plunged into the mixture of clay and coke and turned on his power. At the end of a stated time he pulled out what was left of the carbon rod, broke open the shell of the fused mass in the bowl, and discovered a few tiny bluish diamond-like crystals. These he found were so hard and so sharp that they would very readily scratch glass. He experimented further and made enough of the crystals to fill a tiny bottle which he took to New York and there he prevailed upon a noted jeweler to crush the crystals to a powder form and to use the powder for rough polishing diamonds, rubies, sapphires and other precious and semi-precious stones. The material, which proved to be silicon carbide and to which is given the registered trade mark "Carborundum" by The Carborundum Company, worked so well that he went back to Monongahela City with an order for several ounces of the new product. The first price was 40c. a carat or at the rate of \$880 per pound. He then built a small furnace of firebrick and began making Carborundum Brand Silicon Carbide in larger quantities. This he sold for grinding valves in industrial plants. Then he began making tiny wheels

THE STORY OF CARBORUNDUM

of the new abrasive for the grinding of teeth—dentists used them and still do. A little later, in 1895, when the great power development at Niagara Falls was announced, Dr. Acheson built a plant at Niagara and made the second contract with the Niagara Falls Power Company, calling for a thousand horse power of electric energy to operate the big electric furnaces he had built.

Today in the Carborundum Plant at Niagara Falls, N. Y., Carborundum Brand Silicon Carbide is made in giant electric furnaces 50 ft. long. The plant produces about 1,500,000 lbs. per month and is equipped to handle 25,000 H.P. of electric energy on a continuous service. A far cry indeed from the little iron bowl in the little plant at Monongahela to the largest electric furnaces in the world in the largest plant in the world devoted exclusively to the manufacture of abrasives.

It is made from a mixture of such common materials as coke, sand, sawdust and salt. These materials are loaded into the electric furnaces of the resistance type. The mixture is subjected to the terrific heat of 4,000° F. and at the end of thirty-six hours the furnace is broken open and the silicon carbide is removed in the form of great masses of gorgeously colored crystals—each crystal, hard, sharp, diamond-like. These crystal masses are crushed down to the individual crystals or grains, the grains are mixed with certain bonding agents and formed into grinding wheels, sharpening stones, razor hones, scythe stones and countless other abrasive tools.

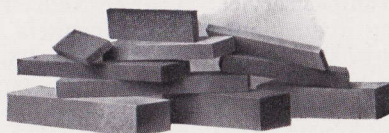
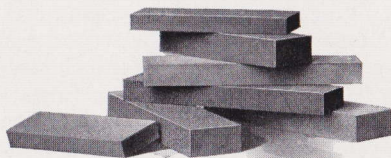
Carborundum Brand Sharpening Stones are made in a wide variety of shapes, sizes and grits for keeping sharp all edge tools. They will be found invaluable in the tool kit and on the work benches of the carpenter, woodworker, craftsman, the home worker, manual training student—in fact all users of edge tools.

These stones will be found notable for their fast, clean cutting, their uniformity of grit and structure, their ability to maintain a free cutting surface and their long life. In this booklet you will find many helpful hints regarding the sharpening of edge tools. You will also find a list of various sizes of the general line of these sharpening stones which can be purchased from your hardware dealer. A complete catalog of Carborundum Brand Products will be sent on request.

THE CARBORUNDUM COMPANY

Carborundum Brand Sharpening Stones

REG. U. S. PAT. OFF.



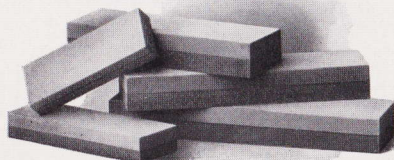
POSITIVELY unequalled for rapid cutting qualities. Used dry or with water or oil. Are quite porous and may be tempered in their cutting by filling with wax or vaseline.

																				Each
No. 115—Fine,	8 x 2	x 1	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	\$1.50
No. 116—Medium,	8 x 2	x 1	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.50
No. 117—Coarse,	8 x 2	x 1	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.50
No. 118—Fine,	8 x 2	x ¾	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.35
No. 119—Medium,	8 x 2	x ¾	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.35
No. 120—Coarse,	8 x 2	x ¾	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.35
No. 121—Fine,	6 x 2	x 1	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.15
No. 122—Medium,	6 x 2	x 1	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.15
No. 123—Coarse,	6 x 2	x 1	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.15
No. 124—Fine,	6 x 2	x ⅝	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.90
No. 125—Medium,	6 x 2	x ⅝	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.90
No. 126—Coarse,	6 x 2	x ⅝	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.90
No. 130—Fine,	6 x 1½	x ½	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.70
No. 131—Medium,	6 x 1½	x ½	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.70
No. 132—Coarse,	6 x 1½	x ½	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.70
No. 133—Fine,	7 x 2	x 1	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.25
No. 134—Medium,	7 x 2	x 1	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.25
No. 135—Coarse,	7 x 2	x 1	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.25
No. 136—Fine,	5 x 2	x ⅝	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.75
No. 137—Medium,	5 x 2	x ⅝	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.75
No. 138—Coarse,	5 x 2	x ⅝	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.75
No. 142—Fine,	4 x 1¾	x ½	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.65
No. 143—Medium,	4 x 1¾	x ½	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.65
No. 144—Coarse,	4 x 1¾	x ½	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.65
No. 145—Fine,	4 x 1	x ¼	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.45
No. 146—Medium,	4 x 1	x ¼	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.45
No. 147—Coarse,	4 x 1	x ¼	inches	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.45

Carborundum Brand Combination Stones

REG. U. S. PAT. OFF.

Made in Seven Sizes



DESIGNED especially for carpenters, mechanics and home craftsmen.

They are made with one face of coarse and one face of very fine grit. The coarse side can be used for sharpening very dull

tools; the fine side for giving required keen, lasting edge.

				Each
No. 108—8 x 2	x 1	inches		\$1.75
No. 109—6 x 2	x 1	inches		1.25
No. 110—7 x 2	x 1	inches		1.50
No. 111—5 x 2	x ¾	inches		1.00
No. 112—4 x 1¾	x ⅝	inches		.85
No. 328—8 x 3	x 1	inches		2.25
No. 329—9 x 3	x 1½	inches		3.25

Carborundum Brand Round Combination Bench Stone

THIS stone is made in the round form so as to allow for the circular motion used in sharpening chisels and similar tools.

It is made with one side coarse grit for taking out nicks and bringing the tool to an edge and the other side of a very fine grit for giving the keen, finished edge.

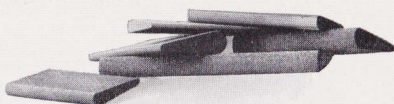


	Each
No. 107—Combination Stone, 4 inches diameter	\$1.25
No. 48—Wood Box for No. 107 Combination Stone	1.50

Carborundum Brand Slip Stones

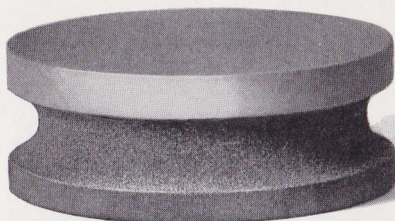
REG. U. S. PAT. OFF.

THESE stones are made in five sizes and three different grits of each size. They cut rapidly and hold their shape perfectly.

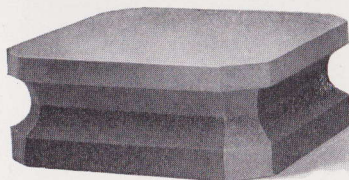


																			Each
No. 174—Fine,	6	x	2¼	x	¾-⅜	inches	.	.	.	.	.	.	.	.	.	.	.	.	\$1.15
No. 175—Medium,	6	x	2¼	x	¾-⅜	inches	.	.	.	.	.	.	.	.	.	.	.	.	1.15
No. 176—Coarse,	6	x	2¼	x	¾-⅜	inches	.	.	.	.	.	.	.	.	.	.	.	.	1.15
No. 177—Fine,	4½	x	1¾	x	¼-⅙	inches	.	.	.	.	.	.	.	.	.	.	.	.	.65
No. 178—Medium,	4½	x	1¾	x	¼-⅙	inches	.	.	.	.	.	.	.	.	.	.	.	.	.65
No. 179—Coarse,	4½	x	1¾	x	¼-⅙	inches	.	.	.	.	.	.	.	.	.	.	.	.	.65
No. 180—Fine,	4½	x	2⅛	x	⅝-⅙	inches	.	.	.	.	.	.	.	.	.	.	.	.	.90
No. 181—Medium,	4½	x	2⅝	x	⅝-⅙	inches	.	.	.	.	.	.	.	.	.	.	.	.	.90
No. 182—Coarse,	4½	x	2⅝	x	⅝-⅙	inches	.	.	.	.	.	.	.	.	.	.	.	.	.90
No. 183—Fine,	4½	x	1¾	x	½-⅙	inches	.	.	.	.	.	.	.	.	.	.	.	.	.65
No. 184—Medium,	4½	x	1¾	x	½-⅙	inches	.	.	.	.	.	.	.	.	.	.	.	.	.65
No. 185—Coarse,	4½	x	1¾	x	½-⅙	inches	.	.	.	.	.	.	.	.	.	.	.	.	.65
No. 186—Fine,	4	x	1	x	⅙-⅙	inches	.	.	.	.	.	.	.	.	.	.	.	.	.60
No. 187—Medium,	4	x	1	x	⅙-⅙	inches	.	.	.	.	.	.	.	.	.	.	.	.	.60
No. 189—Coarse,	4	x	1	x	⅙-⅙	inches	.	.	.	.	.	.	.	.	.	.	.	.	.60

Carborundum Brand Combination Knife Stones



DESIGNED especially for sharpening planer knives, and paper and cloth cutting knives without taking the blade from the machine. The groove protects the fingers. Made with one side fine grit and the other side coarse grit.



	Each
No. 289—Combination Stone, 4 inches diameter, 1 1/2 inches thick	\$2.00
No. 332—Combination Knife Stone, 3 1/2 inches square, 1 1/2 inches thick	2.00

Wood and Iron Boxes for Carborundum and Aloxite Brand Oil Stones

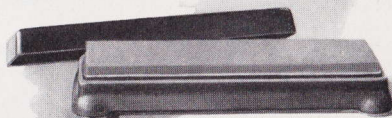


MADE of well-seasoned chestnut. The base is made with a shoulder so that the cover will fit down tight. Boxes are highly polished, have locked corners and are well constructed in every respect. Made in three sizes.

The iron boxes are of a durable cast iron. Close fitting covers.

	Each
No. 49—For stones, 6 x 2 x 1 inches	\$0.40
No. 50—For stones, 7 x 2 x 1 inches . . . . .	.45
No. 51—For stones, 8 x 2 x 1 inches . . . . .	.50
No. 47—For stones, 12 x 2½ x 1½ inches	1.00

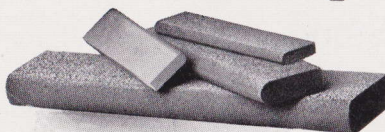
Iron Boxes



	Each
No. 52—6 x 2 x 1 inches	\$0.85
No. 53—7 x 2 x 1 inches	1.00
No. 54—8 x 2 x 1 inches	1.15

Carborundum Brand Round Edge Gouge Stones

REG. U. S. PAT. OFF.



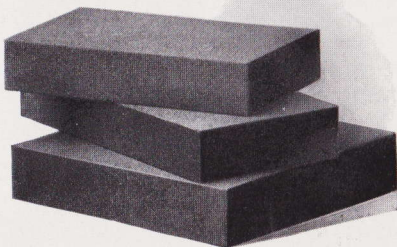
FOR sharpening round edge gouges and similar tools. They are fast cutting, and retain their shape. Made in three grits.

	Each
No. 163—Fine, 5 x 1½ x ½ inches	\$0.90
No. 164—Medium, 5 x 1½ x ½ inches . . . . .	.90
No. 165—Coarse, 5 x 1½ x ½ inches . . . . .	.90
No. 166—Fine, 4 x 1½ x ½ inches . . . . .	.80
No. 167—Medium, 4 x 1½ x ½ inches . . . . .	.80
No. 168—Coarse, 4 x 1½ x ½ inches . . . . .	.80

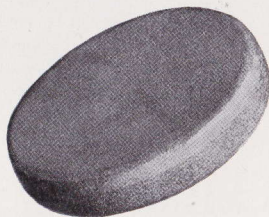
Carborundum Brand Axe Stones

CARBORUNDUM Brand Axe Stones will produce a sharp, keen edge on the dulllest of axes in a very few minutes. Made in four sizes, all convenient for the pocket.

This is a great stone for the lumberman, as well as for the hunter and camper.

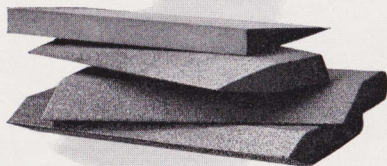


	Each
No. 193—2½ x 1½ x ½ inches	\$0.35
No. 194—3 x 1½ x ½ inches . . . . .	.45
No. 195—2½ x 2½ x ½ inches . . . . .	.45
No. 196—3 inches diameter, ⅝ inch thick . . . . .	.60



Carborundum and Aloxit Brand Carvers' Slips

REG. U. S. PAT. OFF.



THESE slips are made in four different shapes and three grits of each shape; they are exceedingly hard, and retain their knife edge.



Shape Nos. 80, 81, 82 Shape Nos. 83, 84, 85 Shape Nos. 86, 87, 88 Shape Nos. 89, 90, 91

	Each
No. 80—Fine, $2\frac{1}{4}'' \times \frac{7}{8}'' \times \frac{3}{16}''$	\$0.40
No. 81—Med. Fine, $2\frac{1}{4}'' \times \frac{7}{8}'' \times \frac{3}{16}''$	.40
No. 82—Medium, $2\frac{1}{4}'' \times \frac{7}{8}'' \times \frac{3}{16}''$	.40
No. 83—Fine, $2\frac{1}{4}'' \times \frac{7}{8}'' \times \frac{3}{16}''$	.40
No. 84—Med. Fine, $2\frac{1}{4}'' \times \frac{7}{8}'' \times \frac{3}{16}''$	.40
No. 85—Medium, $2\frac{1}{4}'' \times \frac{7}{8}'' \times \frac{3}{16}''$	.40
No. 86—Fine, $2\frac{1}{4}'' \times \frac{7}{8}'' \times \frac{3}{16}''$	.40
No. 87—Med. Fine, $2\frac{1}{4}'' \times \frac{7}{8}'' \times \frac{3}{16}''$	.40
No. 88—Medium, $2\frac{1}{4}'' \times \frac{7}{8}'' \times \frac{3}{16}''$	.40
No. 89—Fine, $2\frac{1}{4}'' \times \frac{7}{8}'' \times \frac{3}{16}''$	.40
No. 90—Med. Fine, $2\frac{1}{4}'' \times \frac{7}{8}'' \times \frac{3}{16}''$	.40
No. 91—Medium, $2\frac{1}{4}'' \times \frac{7}{8}'' \times \frac{3}{16}''$	.40

Carborundum Brand Extra Hard Fine Stones

FOR all tools that require an extra fine, delicate edge. They are made of the finest of the Carborundum Brand Silicon Carbide grain and are graded very hard. Cabinet makers and wood carvers will find these stones especially adapted to sharpening tools. Made in six sizes.

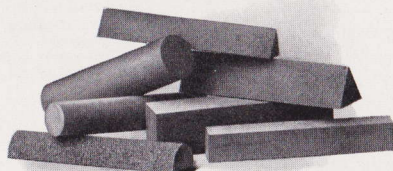
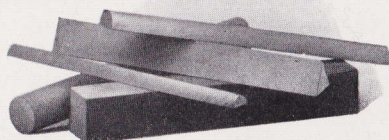


	Each
No. 156— $8 \times 2 \times 1$ inches	\$1.75
No. 157— $8 \times 2 \times \frac{3}{4}$ inches	1.50
No. 158— $6 \times 2 \times 1$ inches	1.25
No. 159— $6 \times 2 \times \frac{5}{8}$ inches	1.00
No. 154 Slip— $4\frac{1}{2} \times 2\frac{1}{8} \times \frac{5}{8} - \frac{1}{16}$ inches	1.00
No. 155 Slip— $4\frac{1}{2} \times 1\frac{3}{4} \times \frac{1}{2} - \frac{1}{16}$ inches	.75
No. 172 Manual Training School Slip— $4\frac{1}{2} \times 1\frac{3}{4} \times \frac{1}{2} - \frac{1}{16}$ inches	.85

THE CARBORUNDUM COMPANY













Carborundum and Aloxite Brand Sticks

REG. U.S. PAT. OFF.



CARBORUNDUM and Aloxite Brand sticks are hard, sharp and fast cutting. They hold their shape and retain their cutting face and edge. Particularly adapted to the work of jewelers, die cutters, engravers and instrument makers and for mould and die cleaning. The sticks are made in three grits: fine, medium and coarse, in 4, 6 and 8-inch lengths, square, triangular, half-round and round and in thicknesses ranging from $\frac{1}{4}$ inch to 1 inch.

PRICE (EACH) FINISHED

Thickness	4-INCH LENGTH				6-INCH LENGTH				8-INCH LENGTH			
												
$\frac{1}{4}$	\$0.50	\$0.65	\$0.65	\$0.70	\$0.70	\$0.85	\$0.85	\$0.95				
$\frac{3}{8}$	.50	.65	.65	.70	.70	.85	.85	.95				
$\frac{1}{2}$	.50	.65	.65	.70	.70	.85	.85	.95	\$1.00	\$1.20	\$1.20	\$1.40
$\frac{5}{8}$	.55	.70	.70	.75	.75	.95	.95	1.00	1.10	1.30	1.30	1.45
$\frac{3}{4}$	.55	.70	.70	.75	.75	.95	.95	1.00	1.10	1.30	1.30	1.45
1	.60	.75	.75	.80	.85	1.00	1.00	1.05	1.20	1.40	1.40	1.50

Carborundum Brand Garnet Paper

REG. U. S. PAT. OFF.

for Sanding and Finishing

ONE of the essentials of the woodworker's equipment is an adequate supply of Carborundum Brand Garnet Paper for the sanding and finishing of woods. In Carborundum Brand Garnet Paper the user is assured of a fast, clean cutting product that is uniformly coated with the hard, sharp, uniformly-graded grains of the highest quality of garnet. Garnet is a natural abrasive, having a greater degree of toughness, hardness and speed of cut than the ordinary sand or flint.

Carborundum Brand Garnet Paper gives a clean, smooth, uniform finish; it holds its grain and it is flexible.

For ordinary woodworking use an assortment of the 9 x 11 inch sheets of Carborundum Brand Garnet Paper should always be in your kit. For the comparatively rough sanding No. $\frac{1}{2}$ -60 Grit should be used and the various degrees of finer finishes this paper is made in 0-80 to 6/0-220 grits, and for cabinet work the extremely fine grit finishing paper in 7/0-240 is recommended.

The Carborundum Company also manufactures a superior brand of Flint Paper in all standard grits.

Carborundum Brand Garnet Paper and Flint Paper are carried in stock by hardware dealers.



CARBORUNDUM
AND ALOXITE ARE
THE REGISTERED
TRADE MARKS OF
THE CARBORUNDUM
COMPANY FOR ITS
PRODUCTS



THE WHITNEY-GRAHAM CO., INC., BUFFALO AND NEW YORK CITY

PRINTED IN U. S. A. FORM A714 10-M 1-25-30

