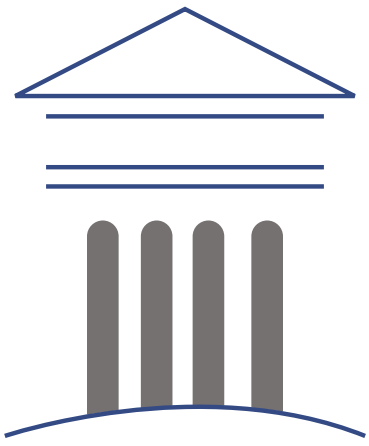
Gunstock Checkering Lab (#)
Lab: 2161

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Introduction

No other phase of gunsmithing provides the opportunity to improve the appearance of a gun more than in checkering. *Checkering* is a series of parallel V-grooves cut into the stock to a depth of about $^{1}/_{16}$ inches. These lines are crossed at sharp angles by another set of parallel grooves of the same depth. Depending on the spacing of these lines, the grooves can serve two purposes. One type of checkering provides the shooter with a firmer grip and greater control of the firearm. The other type is for appearance rather than function.

Regular checkering runs from 16-32 lines per inch (lpi). The 16 lpi checkering is usually found on pistol grips or on a stock that requires a firm grip. The 18, 20, and 22 lpi checkering is the most common type that you will see, but 20 lpi is the accepted standard. The size of decorative checkering is usually 24, 28, or 32 lines per inch.

The fundamentals of checkering are simple and the tools are easily stored. However, checkering is slow, painstaking work. A quality job is not something that can be done in an hour. Very few people will pick up a checkering tool and produce a quality checker job. Checkering takes a lot of practice and patience, but it can be mastered.

In addition to cutting new checkering, you will need to clean and recut the checkering on stocks that are to be refinished. Again, this is not a quick process and the amount of time you spend on each gun should be considered when quoting a price for a customer.

Kit Contents

The tools enclosed in this kit are shown in Figure 1. The part number and a description are listed beside the figure.

Check the material that you received against the parts list to make sure that your kit is complete. If any part is obviously defective or has been damaged during shipment, please return that damaged piece to Sonoran Desert Institute for replacement.



Figure 1: *Lab kit*

** Please note that from time-to-time tools for the lab lessons may be unavailable. Should this occur, we will substitute an appropriate kit that will meet the objective of this lesson. Based on market availability, the exact manufacturers of these pieces vary from time to time. We strive to provide quality tools to our students to use as they gain the knowledge of the Gunsmithing industry. Our students realize that they will be responsible for purchasing additional tools for their businesses.*

Checkering Tools

You have received three handles with cutters and three interchangeable cutters. Two of the handles have single-line cutters. The other handle has a two-line cutter used for marking the rows and for deepening the rows after they are marked. The two-line cutter is a combination spacer and deepening tool which will cut 20 lpi checkering.

The three interchangeable cutters are: F-1, B-1, and 4-20. The F-1 cutter, shown in Figure 2, is a fine, single- line cutter. It can be used to replace the mounted, single-line cutter for the final finishing of the lines or for cleaning or recutting old checkering.

The B-1 cutter, shown in Figure 3, is a border tool and is used for putting the final border around the layout or pattern. The 4-20 cutter, shown in Figure 4, is a right-hand spacing tool with two blades. The left-hand blade does not have any cutting teeth; instead, it is sharp and smooth and is designed to follow a fine guideline. With this blade, it is possible to cut very straight rows in 20 lines per inch.

The final tool in this set is the S-1 tool, shown in Figure 5. This has a cutting blade that is about half the size of the single-line cutter. It is designed to get into tight places around curves. Because its blade is smaller, this tool is more maneuverable.

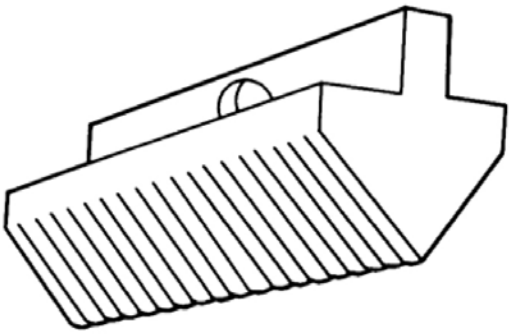


Figure 2: *The F-1 cutter.*

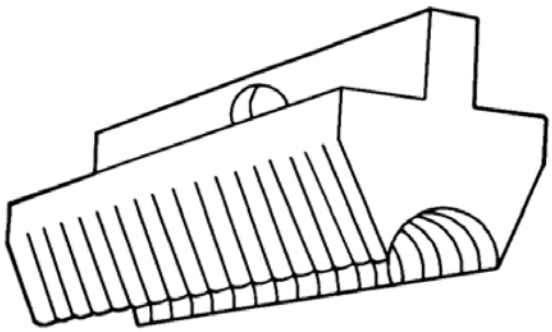


Figure 3: *The B-1 cutter.*

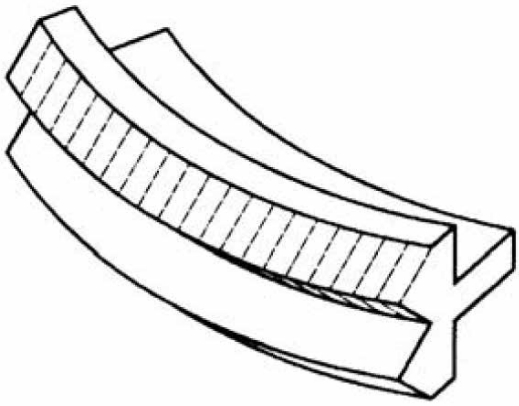


Figure 4: *The 4-20 spacing tool.*

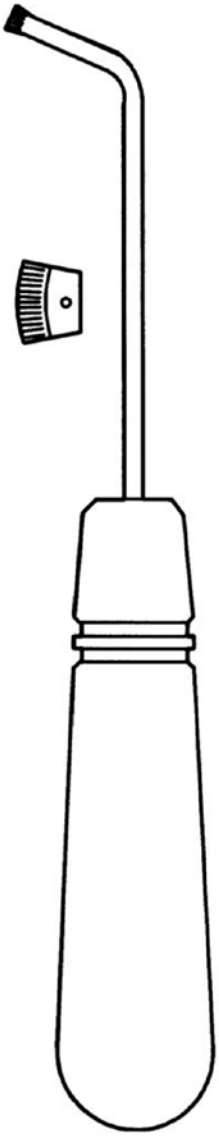


Figure 5: *The S-1 tool.*

Checkering Cradle

In addition to your checkering tools, a checkering cradle, like the one shown in Figure 6, is a necessity. The stock must be held still at all times, yet be adjustable so the fixed light can illuminate the curved surfaces. A cradle lets you rotate the wood so you can concentrate on cutting rather than on holding the wood. Although you can get by with a well-padded vise for forearm checkering, it does not hold a full-length stock very well. Checkering cradles are inexpensive; however, you can make your own. Figure 7 contains the plans needed to build a checkering cradle. The materials listed can be purchased for less than $50.00.

You can use an angle iron for the uprights instead of the 6" piece of 2" x 4", although this will add to the cost of the materials since you have already purchased the wood. You can use any type of bolt for the butt and fore-end holder. All thread and wing nuts are recommended because they are easier to turn without a wrench. If you use wing nuts, be sure that the nuts are staked to the bolt as shown in Figure 8.

Grind the inside end of the butt and fore-end holder to a point. When a stock is placed into the cradle, the fore-end will fit into the 3" PVC pipe cap. The butt holder will stick directly into the butt of the stock. The hole left by the holder will be covered by the buttplate or recoil pad which was removed.

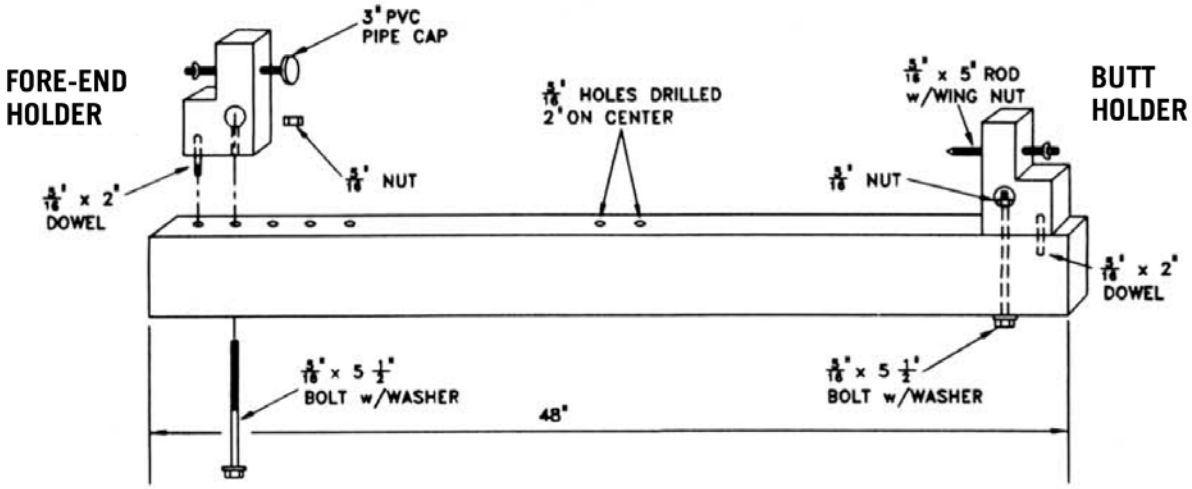
After you have cut the 2" x 4" for all of the pieces for the checkering cradle, you will have about 3' of board left. This can be used to make a fixture for cleaning rifles and shotguns. Cut the remaining piece of 2" x 4" as shown in Figure 9. When finished, these pieces can replace the uprights of the checkering cradle. This will provide you with a "third hand" for holding the muzzle lower than the breech when cleaning rifles and shotguns.

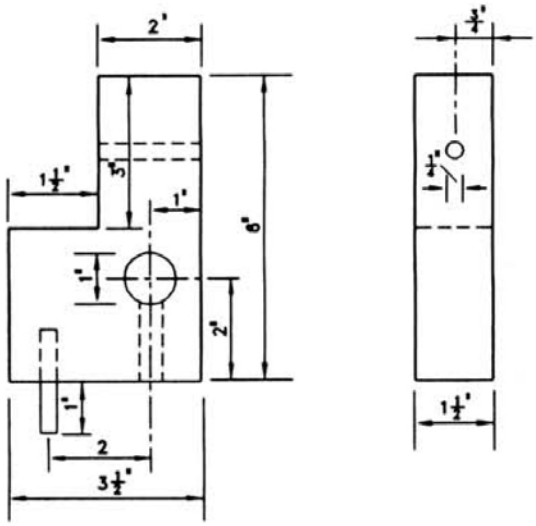
After all of the wood has been cut, sand and stain it. This will prevent splinters and seal the wood so the cleaning solution will not soak into it.

To use the cradle, determine the length of the stock and position the uprights in the correct holes of the base. Tighten the mounting hardware so the uprights will not move during the checkering process. Place the base in a vise. Insert the fore-end into the PVC fore-end holder and tighten the butt and fore-end holders so the stock will not move. The vise should swivel so the stock can be positioned in different directions.



***Figure 6**: A checkering cradle can be very helpful for holding the wood steady while you checker.*





MATERIALS LIST

1 - 2" x 4" x 8'
2 - 5/16" – 18" x 5 1/2" hex bolts
2 - 5/16" – 18 nuts
2 - 5/16" flat washers
1 - 10" length 5/16" all thread
2 - 5/16" – wing nuts
1 - 5/16" x 36" dowel rod
1 - 3' PVC (Plastic) Pipe Cap

***Figure 7**: Plans for a checkering cradle.*

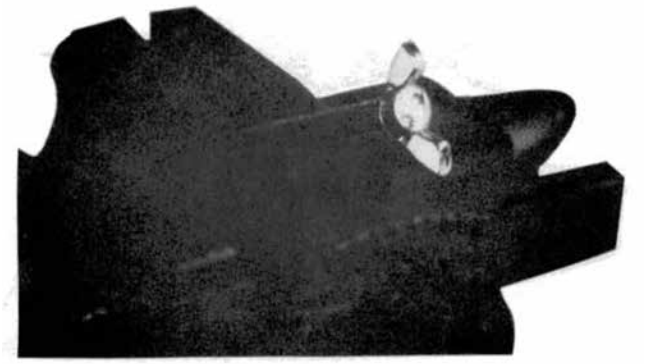


***Figure 8**: Stake the wing nuts for the fore-end and butt supports.*

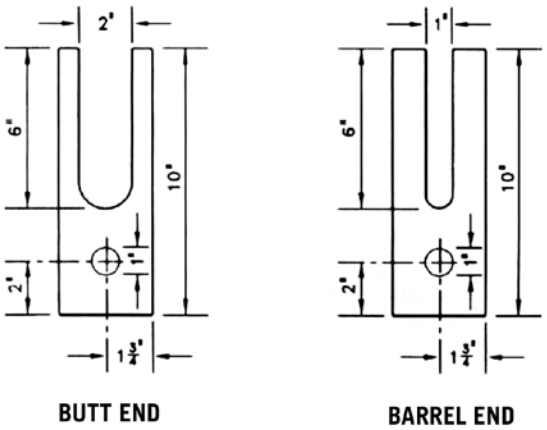


***Figure 9**: To make a cleaning fixture, cut the remaining section of 2" x 4" to these dimensions.*

Checkering

Checkering a stock requires practice. Before you are ready to checker a stock for a customer, you should try checkering scrap wood. You will make mistakes on the first few samples. This is not meant to discourage you, but to prepare you for the later task of checkering a customer's gunstock.

For your first checkering attempt, it is recommended that you use a flat piece of scrap hardwood. Rounded surfaces, such as those found on a gunstock, are harder to checker than flat surfaces. Also, the first attempt at checkering should be done using a simple pattern. Figure 10 is a simple diamond pattern. The sides of the diamond are also the master lines for the pattern. You can trace this pattern and use it as your first checkering pattern.

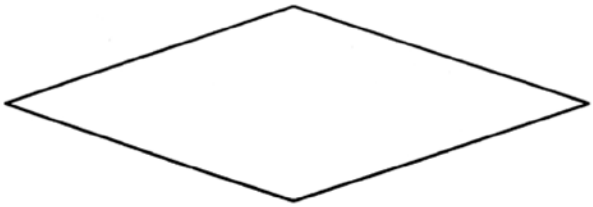


***Figure 10**: A simple diamond can provide a good practice pattern.*

LAYING OUT THE PATTERN

When the pattern outline and master lines have been traced on the paper, lightly tape the paper into position on the wood so you can remove it easily later. Next, using a sharp scribe or ice pick, prick through the paper into the wood in each of the four corners of the pattern. Remove the paper pattern and use a grease crayon or pencil to trace around the outside of the border as shown in Figure 11. The master lines, in this case the outlines, are connected with a sharp scribe. You can use a flexible, transparent ruler as a guide.

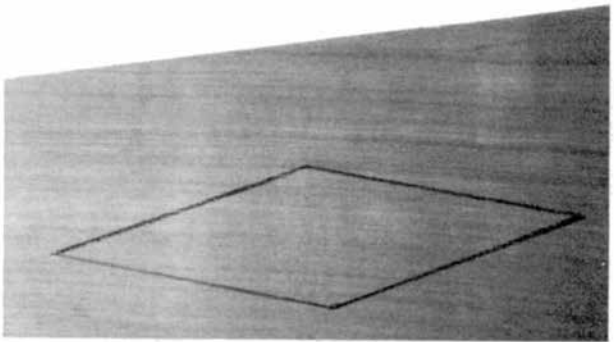


***Figure 11**: Outline the pattern with a grease pencil.*

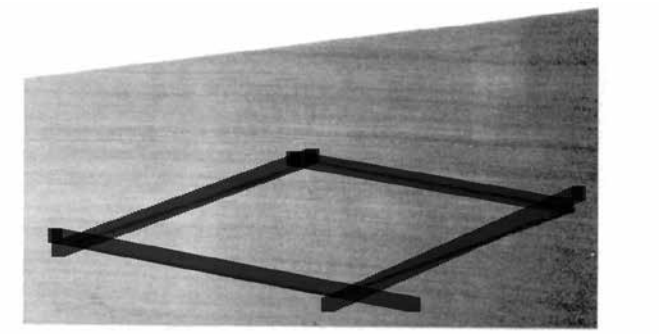


***Figure 12**: After the pattern has been laid, tape the border to help prevent overruns.*

After the master lines have been scribed, mark the pattern with strips of a thin, tough vinyl or electrical tape or even masking tape to form a border, as shown in Figure 12. The purpose of the tape, other than defining the borders, is to help prevent you from overrunning the borders. The protection is not perfect, but it helps.

CUTTING THE PATTERN

At this point, you have scribed the master lines, meaning that they are relatively shallow, but deep enough for the cutter to follow. Now they must be deepened to provide the important first groove for the spacer. Deepen the master lines carefully with the V-cutter.

The first tip in cutting is to hold the tool firmly and move it forward in a staggered motion. Cut on the forward stroke only, then withdraw the tool, and cut forward again. Do not try to guide the tool; conscious "steering" is the best way to make the tool wander to the side. This principle applies when using either the V-cutter or the spacer. The second tip is always cut lightly to avoid gouging the wood.

Notice that the cutting blades are rounded, not flat. While cutting most of the line, you should be using the back part of the blade, as shown in Figure 13(A). Then, when the cut is near the border, rock the blade to the front, as shown in Figure 13(B). This action will allow you to stop the blade at the border with little overrun.

After the master lines have been deepened, ride the guide blade of the spacer back and forth three or four times; concentrate on keeping the guide in its groove. The cutting edge will take care of itself. Press down only on the forward stroke. Sometimes you might run into a hard spot in the wood. In these instances, cutting from the other direction will allow you to continue without any problem.

Space all the lines in the pattern that go in one direction. Remember, you're not going to make the lines deep; you are spacing rather than cutting. Three or four passes with the spacer is usually sufficient. If you make the lines deep, you will have trouble crossing them when you start cutting from the

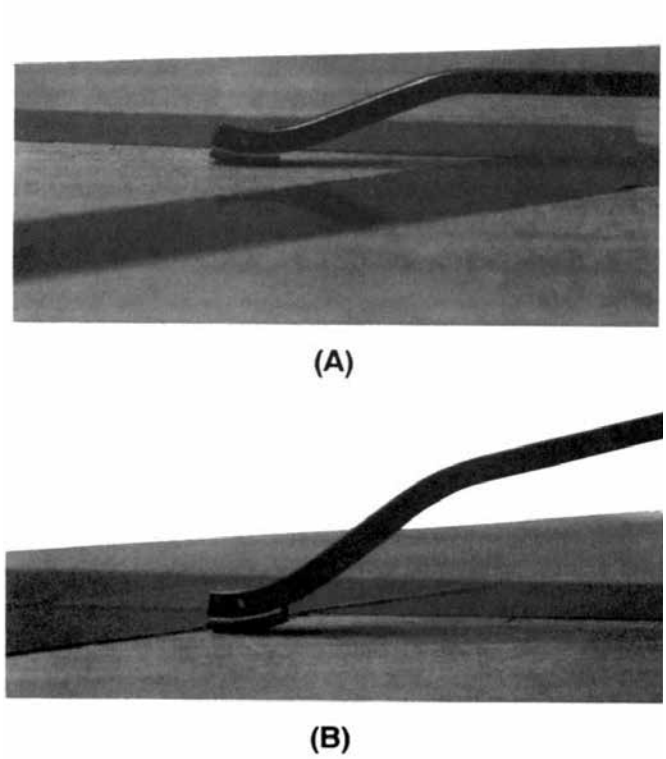


***Figure 13**: (A) Illustrates how to cut with the back of the cutter tool. (B) Shows how to cut with the front of the blade when near a border.*

other direction. As a result, your tool will fall into a hole each time it encounters a deep groove.

Once all of the lines have been cut in one direction, as shown in Figure 14, cut the master line and space the lines in the other direction.

After all lines have been cut with the spacer and your crisscross pattern is complete, deepen the lines with the V-cutter. Two or three passes are usually necessary to cut the shallow grooves to the proper depth. When the proper depth is attained, move on to the next line and repeat the procedure. When all the lines going in one direction are deepened, proceed to cut the diagonal lines.

Cutting the lines to the proper depth is what forms the diamonds. When partially cut with the spacer, the diamonds are flat-topped. Only after using the V-cutter do the flat plateaus become diamond-shaped pyramids, as shown in Figure 15. After all the lines in the pattern have been cut to the correct depth, remove the tape from the border.

When spacing and cutting, clean your work area frequently with a toothbrush in order to keep the lines clear.

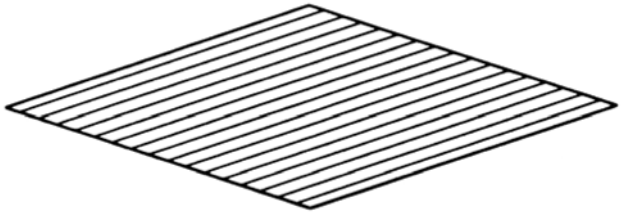


***Figure 14**: Cut all lines in one direction before cutting the cross lines.*

Once you have practiced on a flat piece of wood, you are ready to try a gunstock. The difference is the curve of the wood gunstock as opposed to the flat scrap wood. You can practice on the stock blank that you received or you can practice on an old stock and save the blank for a custom stock.

Military surplus rifles are readily available to FFL holders at reasonable prices. The stock from one of these surplus rifles can be used for practice and the stock blank can be inletted for a replacement stock. This will turn the military surplus rifle into a fine sporter that you will be proud to display.

We have included a checkering decal which can be used to checker your stock. You can either trace this pattern for practice or use the decal, but the decal is not reusable.

To apply the decal, cut the pattern along the dotted lines. The centerline for the fore-end checkering should allow you to use the fore-end decal in one piece. If your stock is too wide, cut along the centerline. When you apply the decal, be sure that the tops of both decals are the same distance from the top of the stock.

Once the decals are cut apart, soak them in water for a few minutes to loosen the backing paper. Dampen the area of the stock where you will apply the decals. Remove the decals one at a time and apply them to the stock. The decals, while wet, can be moved around the stock so you can get them into position on the pistol grip and fore-end of the stock. Once in place, wipe the decals with a tissue or cotton to remove the excess moisture. Let the decals dry for 30 minutes before beginning the checkering.

Start checkering by scribing the outline and master guidelines with a straight edge and a scribe or sharp knife. Once the lines have been scribed, use a V-tool to cut the master guideline. Proceed to space the lines with the spacing tool and cut them to full depth with the V-tool as before. The decal is made of a material that will allow you to checker through it. You will not dull or clog the cutting tools by checkering through the decal.

Recutting Old Checkering

Now we will discuss recutting or tracing of old checkering. Vintage guns with worn, but well-defined, checkering and borders are a splendid way to get started.

The checkering on old guns was probably done with hand-made tools. The chance that checkering on old guns will match a modern tool is remote. The simplest procedure in recutting and restoring old checkering is to use a V-cutter with only one cutting edge. The diamonds will be flat, apparently from wear, but they might have been originally cut with the diamonds flat-topped.

Old finish will have probably filled the lines, so extra care must be used since you will be cutting each line with nothing but the clogged line to guide you. Trying to use a plastic or steel straightedge on the pistol grip will only result in an overrun.

There are two other options that you can try. First, you can use a varnish solvent to soften the old finish and then brush-cut the lines. Another choice is to carefully scrape and sand away the old checkering almost to the bare wood, but leaving marks from the joints of the original checkering lines and borders. You then rechecker just as you would on a new stock except that your pattern is already laid out.

Once cut, the new checkering will erase the old lines. The greater depth of the new lines will not be noticeable.

This same procedure can be used to restore badly scarred or dented checkering. Again, do not sand all of the old lines out. Sand only as far as necessary to remove the dent, then recut the checkering. Trying to rechecker by cutting the lines over a bad dent will leave a very noticeable depression.

There is another factor involved in restoring checkering even in relatively new stocks cut with modern tools. Many European countries use the metric system. Checkering cut with metric tools will not match cutting tools manufactured in the United States. For work requiring meticulous restoration, a wood raffler should be used. A raffler is, in effect, a bent three-cornered file that is easier to control than the standard checkering tool.

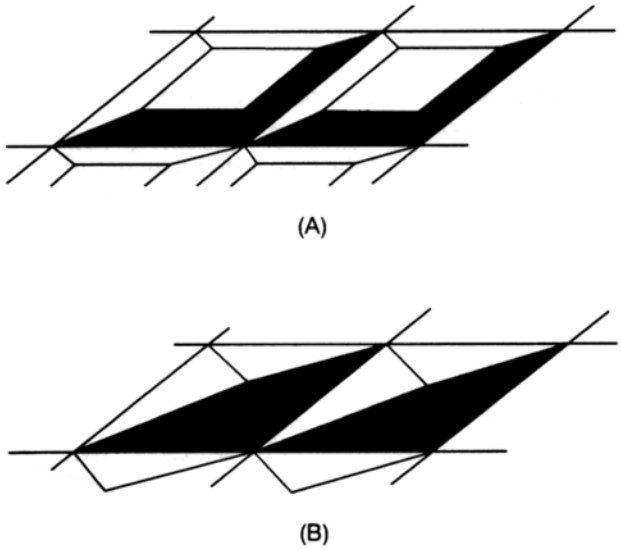


***Figure 15**: (A) Shows unfinished diamonds. (B) Displays finished diamonds.*

After the new checkering has been cut, sand and finish the stock. If you are tracing or recutting existing checkering, you can now remove the old finish on the stock and refinish it.

Remember, being able to perform a quality checkering job will require practice and patience. Take your time and you will be pleased with your results. Do not start the job if you are going to be rushed. A checkering job that is hurried will look hurried or messy and will have to be redone. Sanding and recutting the checkering will take longer than proceeding slowly the first time.

Protecting the Checkering

When finishing a gunstock that has been checkered, you will want to keep the filler and finish out of the checkering, including any border around the checkering pattern. Use masking tape to cover these areas. When the finish has been completed on other parts of the stock, remove the masking tape and brush a couple of coats of Dem-Bart Stock Finish into the checkering using a soft toothbrush.

You want to protect the checkering from dirt and perspiration, but you do not want to gum up the lines. Although the rest of the stock surface is finished with epoxy, use the Dem-Bart Stock Finish in the checkered areas. You will probably have a different color or shade in these areas when you finish.

In order to avoid gumming up the checkering, the checkering on many new stocks is cut after the stock has been finished. The checkered areas are then given a light coat of Dem-Bart Stock Finish or a similar light oil. Some stockers like to use a linseed oil or Lin-speed oil and mineral spirits mixed in equal parts. The latter mixture will usually dry more quickly and be ready for use sooner than if linseed oil alone is used.



Finishing a gunstock will help protect the design for many years.

Lesson Questions

THIS IS EXAMINATION NUMBER 2161.

Make sure you print your name, student number, and examination number (Lesson No.) in the space provided on the Answer Form. Be sure to fill in the circles beneath your student number and lesson number.



REMINDER: A properly completed Answer Form allows us to evaluate your answers and speed the results and additional study material to you. Do not hold your Answer Forms to send several at one time. You may run out of study material if you do not send your answers for evaluation promptly.

You may also complete your exams and submit them online via the SDI Student Services page at www.sonoranlearning.com.

1. The master guidelines are cut into the stock using a(n)

a. B-1 tool.
b. F-1 tool.
c. S-1 tool.
d. 4-20 tool.

2. The borders around the checkering pattern are cut with a(n)

a. B-1 tool.
b. F-1 tool.
c. S-1 tool.
d. 4-20 tool.

3. The checkering tool used to space the lines is the a(n)

a. B-1 tool.
b. F-1 tool.
c. S-1 tool.
d. 4-20 tool.

4. When recutting old checkering, which tool should be used?

a. B-1.
b. F-1.
c. S-1.
d. 4-20.

5. Checkering lines on a gunstock serves no function other than appearance.

a. True.
b. False.

6. To help prevent overruns while cutting the lines, the border is cut first.

a. True.
b. False.

7. To apply the checkering decal, soak the decal in water for

a. 3-5 minutes.
b. 5-10 minutes.
c. Only long enough for the decal to loosen from the backing.
d. 1 hour.

8. The first lines to be cut with a checkering tool are the

a. Borders.
b. Outlines.
c. Guide lines.
d. Horizontal lines.

9. When cutting a new pattern, all of the lines in one direction should be cut before cutting the crossing lines.

a. True.
b. False.

10. The lines of the pattern are cut to the full depth during the spacing process.

a. True.

b. False.