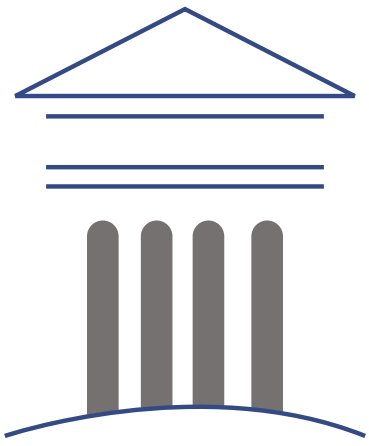
Repair and Restoration
Lesson: 2190

OBJECTIVES	3
INTRODUCTION	4
GUNSTOCK REPAIRS	4
Removing Dents	4
Repairing Gouges	7
Split Buttstocks	7
Breaks At Grip	9
Self-Test Questions	10
REFINISHING GUNSTOCKS	11
Tools And Materials	11
General Refinishing	12
Self-Test Questions	15
ANSWERS TO SELF-TEST QUESTIONS	16
LESSON QUESTIONS	17





Objectives

After completing this lesson, you should

1. Be familiar with the steps taken to raise a dent in a gunstock.
2. Know how to repair a break in the pistol grip of a stock.
3. Know what type of wood should be used in repairing a damaged gunstock toe.
4. Understand the methods of removing the old stock finish.

Introduction

Few gunstocks manage to escape a hunting season without some damage. Nicks and dents are prevalent in frequently used firearm stocks — even when the owners are extremely careful. Most of this damage is not serious and can be corrected or at least alleviated. However, some gunstocks have seen horrible abuse, resulting in cracked or broken wood, severe dents or gouges, lack of finish, etc. These severely damaged stocks might look like hopeless cases, making complete restocking the only apparent solution. But, there are many reasons why a firearm should not be restocked. Perhaps the gun owner lacks the experience to attempt a complete restocking project, or perhaps the cost would be too high. The firearm might be a collector's item, and if so, any alteration of original parts might lower the gun's value.

Gunstock alterations, like gunstock repairs, can be minor or major. The alteration might consist of removing surplus wood from a thick, military stock or splicing in a high cheekpiece on a low, comb stock for a telescopic sight. Perhaps the shooter wants to take a conventional, factory stock and alter it to better suit his or her physique or shooting needs. For example, the length of pull on most factory firearms is of a length to suit the "average" shooter. Obviously, those with shorter arms would need a shorter length of pull, requiring that the buttstock be shortened slightly. Perhaps the shooter is very tall; then the stock would be too short and would have to be lengthened, usually by installing a recoil pad of the correct thickness.

There are many repairs and alterations performed each year on gunstocks. Some are functional, some are cosmetic, and some are both. This lesson will show you exactly how to handle nearly all common stock ailments as well as how to alter stocks to better suit your customer's needs.

Gunstock Repairs

REMOVING DENTS

Dents and bruises on hunting guns are probably the most common problems that you will encounter. Since dents and bruises do not seriously affect the normal functioning of the weapon, few shooters bother to have them removed. It is only when a serious problem occurs— such as a split pistol grip or a break across the tang — that most shooters will consider having their stocks repaired. Others take a sense of pride in their firearms and want even the tiniest flaw corrected immediately.

The only tools required to raise dents in wood are a soldering iron, an old towel, and a cup of water. A dent in wood is merely a compression of wood fibers, and the application of steam to the area will cause the fibers to swell and rise to the surface of the wood.

To remove a dent from a gunstock, lay the stock on a padded surface to protect the stock's finish. Then plug in your soldering

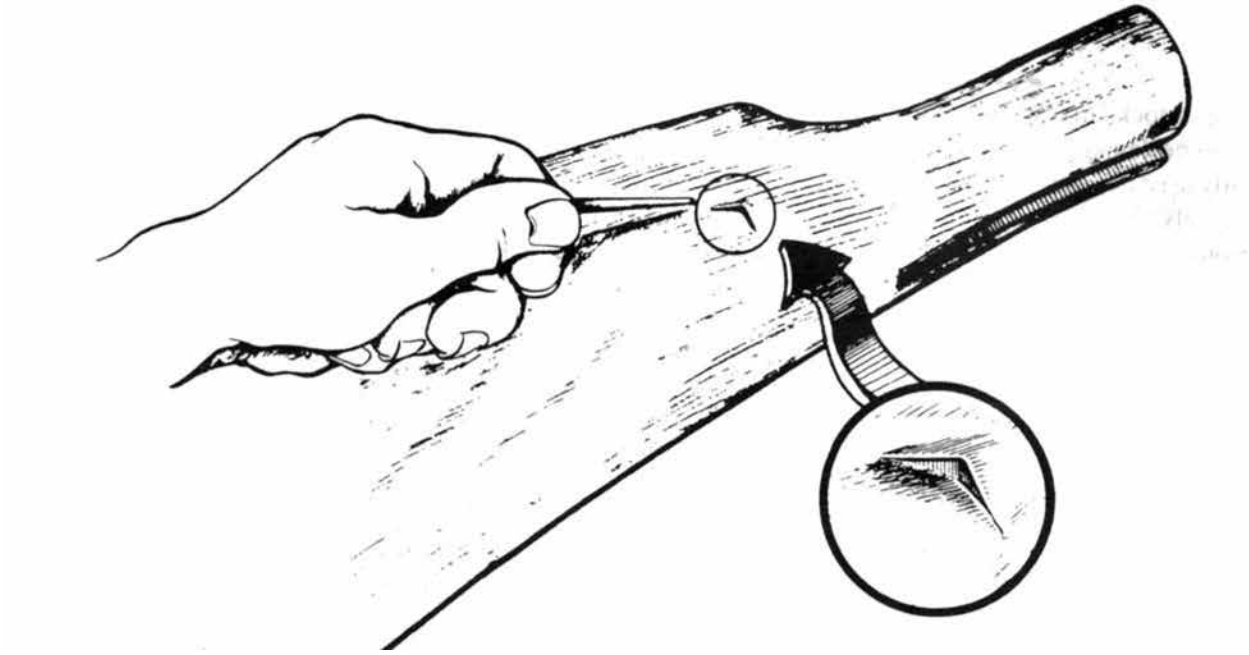


Figure 1: *A dent as deep as this one cannot be satisfactorily sanded out. It must be either filled in or raised with steam.*



***Figure 2**: Use a damp cloth and soldering gun to raise the dent in the buttstock.*

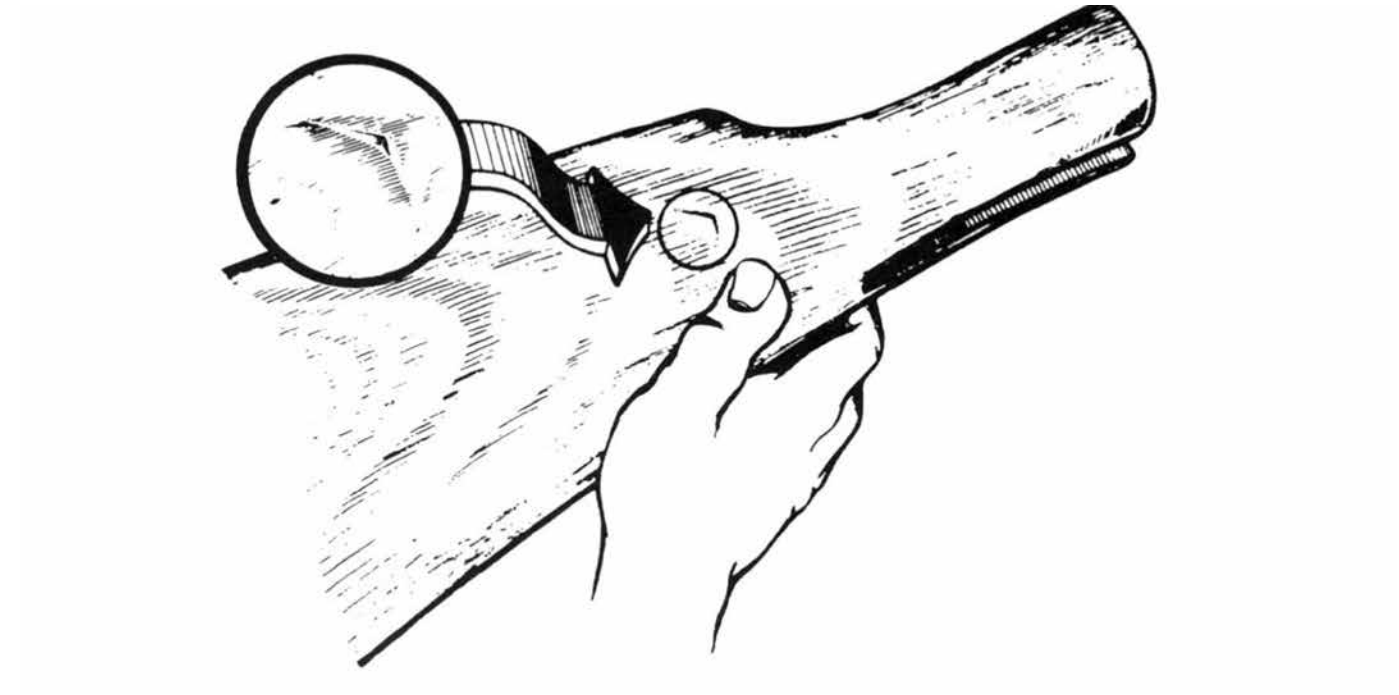


***Figure 3**: After only one application, the dent has been raised considerably. However, it usually takes several more applications to raise dents flush with the adjacent surface.*

iron or soldering gun and dampen a comer of a towel. Place the damp towel over the dented area of the stock, covering only the dented area and not the wood surrounding the dent. Now place the soldering gun lightly on the damp towel right over the dent. Steam will emanate from the towel into the dented area almost immediately. You want to make certain that you do not hold the hot soldering iron on the towel long enough to scorch the wood underneath, just as long as you can see steam pouring out from the towel.

After the first application, dampen the towel again, place the hot iron on the towel over the dented area, and allow more steam to flow into the dented surface. Repeat this procedure until the dent is raised to the surface of the stock. This may take as few as 3 applications or more than 20, depending on the depth of the dent, the type of wood, the remaining finish on the stock, and other factors. That's all there is to it! Figures 1-3 illustrate this procedure.

The above method will handle 90% of the dents found in gunstocks, however, the steam method will not replace wood in gouges where wood has been removed. Steam only swells the fibers and makes them rise to the surface. There are also some dents that won't yield to the indirect-steaming method described above. If not, applying a steady flow of steam directly to the center of the dent for a minute or two should work.

It is quite simple to make an apparatus for delivering a steady flow of steam. All you need is a tin can with a screw-on lid, a short piece of copper tubing with an inside diameter of approximately 1/8", and about an 18" length of rubber hose to fit snugly over the copper tubing. Punch a hole in the lid of the can so a 2" length of copper tubing will fit snugly into the hole; solder this in place. Then attach the rubber hose onto this piece of copper tubing. Also insert about a 4" piece of copper tubing in the opposite end of the hole. Fill the can about half full of water, screw the lid on tightly, and place it on a source of heat. In minutes the water will start to boil, and soon you will have a steady flow of steam coming out of the copper tubing attached to the rubber hose. If more pressure is required, you can crimp the end of the tubing slightly, which will act much like the nozzle on your garden hose.

If the dent should occur in checkered areas of the stock, after raising the dent with steam, chances are the checkering itself will require touching up a bit. Usually, the entire checkering pattern will not have to be recut, only the area that came into contact with the steam. Use a conventional checkering tool



***Figure 4**: To repair a gouge like this in a gunstock, either use filler or splice in a piece of wood. This gouge would be an ideal candidate for a diamond inlay.*

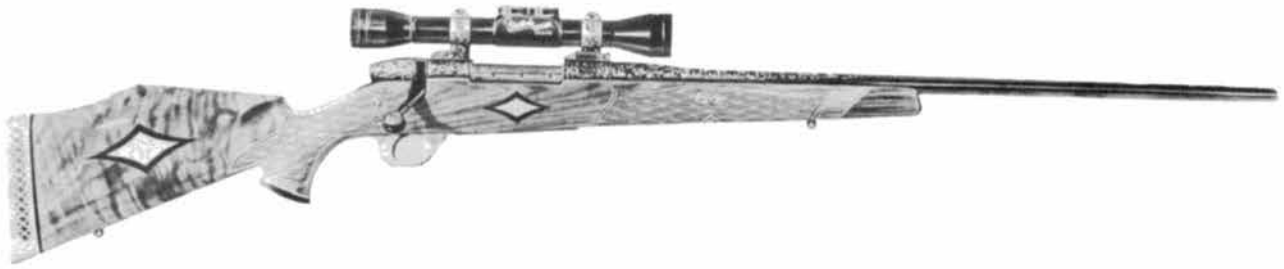


***Figure 5**: Sometimes it is best to use inlays in a gunstock to cover gouges rather than trying to splice in a piece of matching wood.*

or a three-square bent needle file to recut the damaged area. Then take a toothbrush containing a dab of Dem-Bart Stock Finish or similar product and go over the entire pattern. This method will normally blend in the newly cut lines with the old. If it does not match, you will have to recut the entire pattern.

REPAIRING GOUGES

Gouges or deep gashes in gunstocks cannot be raised with steam and have to be filled, either by splicing in an inlay or by filling with a wood filler, such as shellac sticks to match the wood color or walnut wood dust and glue. The only trouble with fillers is getting an exact match for the wood being repaired. It takes a keen eye and a lot of luck. If the gash is not too large, the raw wood can be stained to match the finished wood, and then transparent shellac can be applied to form an even surface. Like most repair techniques, you should acquire a reasonable amount of experience before attempting to do this on your favorite rifle.

Deep gouges or places where the wood in the stock has been splintered away, like the stock in Figure 4, require splicing or plugging to repair the flaw. Splicing takes careful matching of the color and grain of the wood, but if done properly, such a splice is hardly detectable. Of course, the strength of the repair is another consideration. The repaired area must be as strong as the original wood, but this should not be a problem with the many fine glues and epoxy kits available today.

A plug is normally used to repair a small gouge in the wood. A round hole of sufficient depth is first drilled in the stock, and then the plug is turned to (or obtained at) the exact size of the drilled hole. This plug should fit snugly, but without so much pressure that it might possibly split the wood. Walnut dowels are available, but can be hard to find. Most dowels have the end grain exposed, which makes the repair more conspicuous. A better plug is one with the side grain exposed so as to more closely match the surrounding area of the stock where the repair is to be made.

A ¼" plug is usually plenty for most repairs, but on some curved surfaces, a ½" plug may be necessary. As the plug is inserted into the cutout, align the grain in the plug to match that of the existing stock around the repair. Then, when stained and finished, the repair will be almost unnoticeable.

Sometimes it is almost impossible to repair a gouge without it being highly noticeable. In cases like this, it may be best to inlay an attractive piece of contrasting wood to cover the gouge much like the inlays used on Weatherby custom rifles, as in Figure 5. Another technique is to carve a design in the area to camouflage the gouge, adjusting the carving to blend in with the gouge.

SPLIT BUTTSTOCKS

One of the most common stock repairs will be repairing split heels or toes of buttstocks. It does not take too much of a jolt to split off a piece of wood when the firearm is dropped or allowed to slam to the ground. The repair entails finding a piece of matching wood, with the grain running in the same direction as the original and splicing it in where the wood has been broken away.

The first step in this type of repair is to remove the old finish down to the bare wood so you can clearly see the original grain and color of the wood. Next, the split must be prepared to accept a new piece of wood. This is accomplished by cutting the ragged break until it is smooth and even. Depending on the type and size of the split, you might want to use a fine-tooth saw first to cut out a square notch in the stock and then use a wood rasp and file to smooth the cut. Or, if the break is not too ragged, perhaps a rasp or plane will suffice without any sawing. To check the accuracy of the cut, lay a flat-edged ruler or other straightedge on the smoothed surface and hold it up to eye level against a strong light. You will detect any dips or waves in the cut instantly. Additional cuts with a file will make the surface smooth and level. You now want to make certain the cut is absolutely clean — free from oil, sawdust. etc. — because a good solid joint cannot be made if dirt is present.

With the surface prepared, it is now necessary to find a piece of wood that closely matches the original in both grain and color. This might be a difficult problem, especially if the stock being repaired is rather old. This is why it would be a good idea if you saved every piece of suitable stock wood that you come across. Often a rifle or shotgun will come in for a complete replacement of the wood. The old stock is removed and placed in the "junk" bin with the others that have accumulated over the years. Old broken stocks usually have plenty of good, solid wood left on them that can be used to repair other stocks; and the aged stocks will more closely match a used stock than new wood.

Once you find a suitable piece of wood, closely examine it to see what section is the best for the repair. Then use a fine-tooth saw (such as a hacksaw) to cut off a block of wood to fit into the notch in the stock being repaired. In doing so, be sure to allow enough wood for working the repair down to the exact shape of the original stock. During this examination, you will notice that the bottom line on most stocks (in the case of a broken toe) travels straight from the pistol grip down to the toe of the stock. However, on some designs, especially those made in Europe, the stock may curve as it approaches the buttplate. Determine which design the stock is, and proceed accordingly.

The surface of the replacement wood must be as flat and smooth as the notch cut out from the original stock. Allow about ¼" excess wood all around to allow for final shaping. Any excess wood can be rasped or planed off until the patch blends into the lines of the stock.

However, before planing, the replacement wood must be tightly secured to the original stock. Mix up some epoxy glue and, using a piece of clean wood (such as a toothpick) as an applicator, smear a small amount of the epoxy onto the bearing surfaces of the replacement wood and also onto the existing wood where the replacement wood will make contact. These two surfaces must be covered completely with a very thin coat of epoxy for maximum strength. To ensure good coverage, press

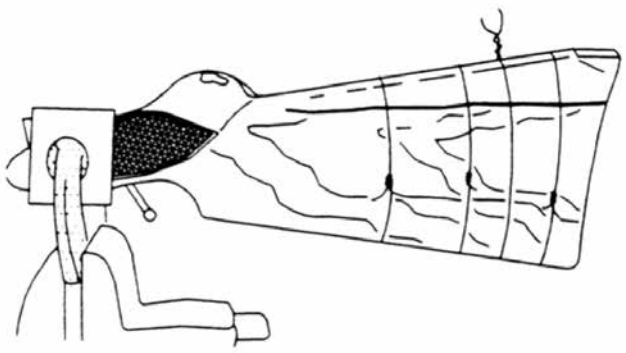


***Figure 6**: The repair to the toe on this stock is held in place with iron wire while the epoxy dries. Eventually, the entire stock will be sanded down and refinished.*



***Figure 7**: A belt/disk sander is a favorite tool in gun shops to smooth down replacement pieces for gunstock.*

the replacement wood into the notch in the existing stock and then slide the replacement wood back and forth a few times to be sure. Then, align the replacement piece correctly, press the two pieces together firmly, and wipe away any excess epoxy that is squeezed out from the joint.

A tight fit can be obtained with this type of joint only if the pieces are held tightly together during the drying process. Conventional wood clamps can be used, but due to the angle in this area of the stock, heavy rubber bands are better. These, however, must be supplemented with either wire, as shown in Figure 6, or tape to ensure maximum tightness. Let the joint dry overnight before continuing.

Methods of final shaping vary from shop to shop, but one preferred method is to use a sanding disk, like the one shown in Figure 7, to cut away the excess wood. Merely hold the glued-together stock against the sanding disk, "eyeballing" the shape as the work progresses. As the shaping nears completion, switch to various grades of sandpaper to obtain a smooth final finish. Some gunstockers prefer to use wood rasps for this shaping, ending with sandpaper and sanding blocks. Either method will work fine: use the technique that suits you best.

When the repair has been sanded to completely and accurately match the existing stock, it is ready for finishing. Wet this portion of the stock, then dry it quickly over a heat source. Be careful not to burn the wood: hold it over the heat only long enough to evaporate the moisture. Keeping the stock moving

at all times will help eliminate burning. This process will bring the whiskers in the wood to the surface, where they can be cut off with steel wool. The wood is then ready for refinishing. In doing so, match the original finish as closely as possible. If this is impractical, it is best to refinish the entire stock to ensure a better match.

In rare cases, it is nearly impossible to match a replacement piece of wood with the original. In these instances, remove the finish from the stock and dye the entire wood surface, adding a little here and there until a perfect shade is produced overall. Then refinish the stock by a method that closely matches the original.

When restoring collector guns with a split heel or toe in the buttstock, many gunsmiths do not like to remove any of the original wood. Rather, they inlet the replacement piece with inletting black, similar to the methods described in the lesson on stock inletting. To do so, first obtain a piece of matching wood of approximately the correct size, with about ¼" to spare. The original stock is thoroughly cleaned in the area of the break, and then inletting black is applied to the irregular wood on the original stock. The new replacement wood is then placed onto the stock and firmly pressed into place before removing. A chisel or Moto-Tool with a cutting burr is used to take off the black marks left by the inletting black. The process is repeated until the new replacement piece of wood looks like it grew to the original stock. This method is time-consuming, but if done correctly, will give the best fit possible to the split buttstock. This technique is also useful for splits around the tangs — another area where splits are prevalent.

Many side-by-side double shotguns are in use, and most of the ones manufactured before World War II have short chambers. When firing modern, high-powered 2¾" shotshells in these shotguns, the chamber pressure increases considerably and causes heavier recoil. After many rounds are run through these shotguns, chances are the stocks will give way — usually around the grip area where the standing breech joins the stock. When such a break occurs, it is usually best to replace the entire buttstock. However, if the split is only minor, a repair can be made instead.

In making a repair to the forward end of a buttstock, the same technique is used as the one described for repairing a split in the toe: the wood surface is first cleaned around the area of the repair; the surfaces are squared and planed smooth; a new replacement piece is cut and epoxied in place; and finally, the replacement piece of wood is shaped to match the original. A professional refinishing job can make the repair almost unnoticeable. However, on some repairs of this nature, it might be best not to cut away any of the existing wood, especially on high-quality stocks. In cases like these, it is best to inlet a replacement piece of wood to the existing stock. The method for doing so is very similar to that used to inlet barrels and receivers into stock blanks.

A replacement piece of wood that closely matches the grain and color of the original wood is obtained and cut to approximate shape. Inletting black is then applied to the rough edges of the original stock, after which the replacement wood is firmly pressed against this area in the original wood. When lifted up, the black marks on the underside of the replacement wood indicate where wood has to be cut away. Cuts are made with a rotary rasp and again placed in position onto the original stock, lifted up again, and more wood cut away where indicated by the black marks caused by the high spots on the existing stock. This procedure is repeated several times until the replacement piece fits perfectly. The final job will be similar to splices made on Japanese furniture: the joints contain no glue whatsoever but remain intact under nearly all loads and strains. A splice in the stock as just described will fit so perfectly and snugly that the stock could be turned upside down without the replacement part falling out.

This type of repair obviously takes much more time than would a conventional cut-and-replace repair, but for a fine-quality shotgun, the extra time is worth the investment. Of course, once a fit has been obtained, the part must be glued in place.

Cracks and other damage along the sides of stocks (but not those around edges) are best repaired with small inlays. To get the shape required, coat the stock around the defect with inletting black, press a piece of white paper over it, and trace the impression on the piece from which the inlay is to be made. Shape up the inlay carefully with a rasp and file, trying often for fit. The edges should also be tapered slightly to ensure a tighter fit. Coat the inside of the recess with epoxy, then coat the replacement inlay. Press the inlay in place and wipe away any excess glue that is squeezed from the edges of the joint. Then clamp the inlay in place and let it dry overnight. Sand down to the surface of the existing wood and finish.

BREAKS AT GRIP

When a rifle or shotgun stock is cracked at the grip section of the fore-end or is broken completely in two, it is best to replace the entire stock. However, a temporary repair can be made by forcing the crack open as far as possible with a thin metal object (such as a hacksaw blade or chisel) and then squeezing in some epoxy. A syringe or hypodermic needle loaded with epoxy is good for this purpose. Clamp the joints together and let them dry overnight, then drill through the stock from side to side and insert a $^1/_8$" brass wood screw. Countersink the screw head, then fill this countersink with a wood plug. Sand down and refinish.

After repairing the break in the grip, try to determine the cause: Why did the stock break in the first place? First disassemble the metal parts from the stock and clean them thoroughly. Coat the receiver with inletting black and fit it back into the stock; then remove it again. Note where the inletting

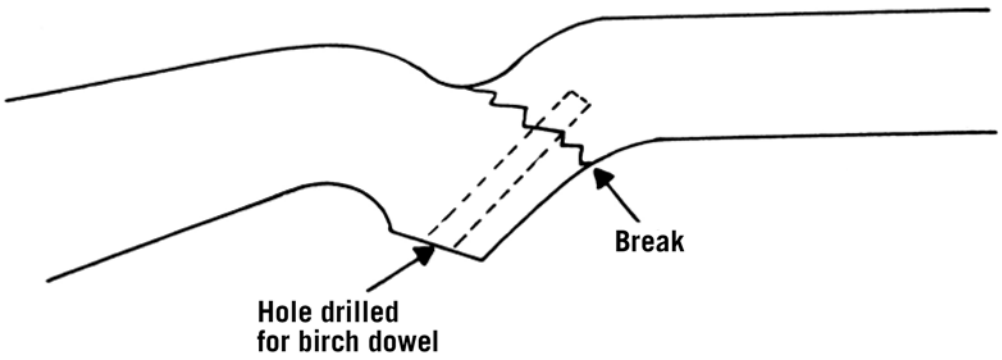


***Figure 8**: To repair a broken pistol grip on a rifle or shotgun stock, first drill up through the grip area; then tap in a birch dowel coated with epoxy and clamp until the epoxy cures.*

black left marks inside the bedding area of the stock and use a chisel to remove these high spots, relieving all pressure at the sides, the rear of receiver, etc., just as you do when you are inletting a barrel and receiver into a new stock blank. If the smudges indicate the recoil lug does not have a good bearing against the shoulder in the stock, use fiberglass bedding.

Many broken gunstocks can be repaired by using epoxy in combination with dowels or pins. Even broken stocks that look terrible can often be repaired and refinished to look as good as new.

The weakest part of any gunstock is usually the pistol grip, although a lot of stocks are cracked around the toe or heel. The pistol grip area should be repaired with epoxy and a dowel or pin. A birch dowel is usually considered the best type of dowel. A wide assortment of stock repairing pins are available that serve the same purpose as dowels, only they are stronger.

To repair a typical break in the pistol grip of a gunstock, select a dowel of a logical size for the stock to accept. Then drill straight through the cap of the pistol grip and on through the broken surface into the other side of the break for a perfect fit, as shown in Figure 8. You will probably have to do some reshaping and sanding in the grip area after the dowel has been press-fitted. Then coat the opposing surfaces liberally with epoxy and bring everything together.

Now comes the problem of clamping the two pieces together. Curved surfaces always to seem to resist C-clamps. A better clamping method is to use long pipe clamps, which bear against the fore-end and butt of the stock, holding the pieces in horizontal alignment. The C-clamps can be used to hold the broken pieces in vertical alignment until the epoxy has cured. You might want to supplement these clamps with heavy rubber bands.

An epoxy joint is quite strong and will probably last for years without any other reinforcement, but additional work will ensure an even longer lasting job. Drill a $^{3}/_{8}$" hole in the upper tang recess, down through the pistol grip, and into the buttstock itself. Then coat a $^{3}/_{8}$" dowel with epoxy and tap it into the hole. Remove the excess with a chisel and clean up the tang mortise. If necessary, fiberglass-bed this tang area.

Once the repair has been made, remove any beads or runs of epoxy with a sharp chisel, then smooth down the epoxy until it blends into the stock contours. Any recesses or holes can be filled with dabs of epoxy and smoothed with a damp rag after it thickens. Avoid getting glue into the checkering or marring the checkering with tools and sandpaper.

At this point, depending on how bad the area looks, a certain degree of refinishing (and perhaps recutting of the checkering) will be in order.

Stocks having small lengthwise splits can sometimes be repaired by breaking them entirely apart at the splits, and then gluing them with epoxy. When the break is made, be careful not to bruise the edge, and take care not to lose any of the splinters; all should be kept in position, leaving one end of any splinter attached, if possible. Then coat the surfaces with the epoxy and carefully work them into place before the parts are clamped in position. Taking care to acquire a perfect fit between the two sections will go a long way to ensure a tight-fitting joint that will be stronger than the original. Then, with a little care in matching dyes, stains, and finishes, a job can be finished that is hardly detectable by any but the experienced eye.

SELF-TEST QUESTIONS

Please check your answers on page 16.

1. **What is the best way to remove shallow dents from a gunstock?**
2. **When repairing a split buttstock, what can be used, other than clamps and wire, to help support the repair while the glue dries?**
3. **What power tool is a favorite to sand down a replacement piece for a buttstock?**
4. ***True or False*. Gouges in gunstocks are best corrected with steam.**

Refinishing Gunstocks

There are thousands of guns in use that, either through wear or abuse, are equipped with stocks that look as though they might have been dragged out of a swamp. Gunstocks get battered around in car trunks and saddle scabbards, scratched by barbed wire and briars, accidentally dropped on rock piles, and even used for emergency boat paddles, all of which damage the appearance. Stocks that fall in this category are good candidates for a refinishing job, provided the wood is generally sound and contains no severe breaks. Refinishing a gunstock is also a good way to ensure a uniform appearance when minor repairs have been made. It is also one of the most satisfying phases of gunsmithing: you get to see a dented, scarred, and otherwise abused piece of wood turn into a thing of beauty.

TOOLS AND MATERIALS

Basic tools for refinishing gunstocks are few. All you really need are several grades of sandpaper, perhaps some sanding blocks, and a whole lot of work. The task is made easier with some additional items such as power sanders and stock-finish remover. The following items will be found in all professional shops. You should become familiar with each, but do not go out and buy all of them at one time; purchase them only if and when the need arises.

Disk Sander. This type of sander cuts very fast and is frequently used to shape gunstocks. It is also used to cut down recoil pads on the buttstock, among other things. However, a disk sander should never be used for final wood sanding, even with the finest grits, because the disk cutting across the grain of the wood will invariably leave scratch marks that are extremely difficult to remove.

On badly abused stocks, the disk sander is used to cut the top finish off quickly, and also to reshape if necessary. Then, most gunsmiths switch to an orbital sander to smooth out all the remaining dents (those that cannot be raised with steam) and scratches left by the disk sander. The final sanding is done by hand with conventional abrasive paper and steel wool.

In using the disk sander for stock refinishing, be sure not to cut too deep or too long; you do not want to leave scratch marks that are hard to remove.

Belt/Disk Sander. If you need a separate belt sander, the combination belt/disk sander, like the one in Figure 7, on page 8, is a good choice. This type of sander may be used on all types of wood projects to shape, sand, polish, and clean. With the proper type of belts, the belt sander is also convenient for polishing metal or for sharpening knives and other gunsmithing tools. The least expensive ones start out at around $400 by the time they are set up and ready to operate. The better ones cost $800-$2,000 and are normally used in professional shops.

Orbital Sander. Palm-sized orbital sanders, with 12,000 orbits per minute, are handy tools for finishing gunstocks. If you use these sanders, many stocks can be completely sanded and ready for the application of finish in about 30 minutes. Gunsmiths normally start out with 40-grit paper on badly abused stocks and progress to 280-grit before final hand-sanding. The offset construction of the sanding pad allows four-way flush sanding.

Electric Paint Stripper. While an electric or gas hotplate works equally well, many gunstockers prefer to use an electric paint stripper for removing old finish (especially oil) as well as for whiskering stocks during the final sanding.

Drum Sander. You will find some use for drum sanders when shaping and finishing gunstocks—especially if used in conjunction with one of the rotary power tools with handpieces. Drum sanders are indispensable for finishing or shaping such areas on the gunstock as the forward stock comb, bolt handle

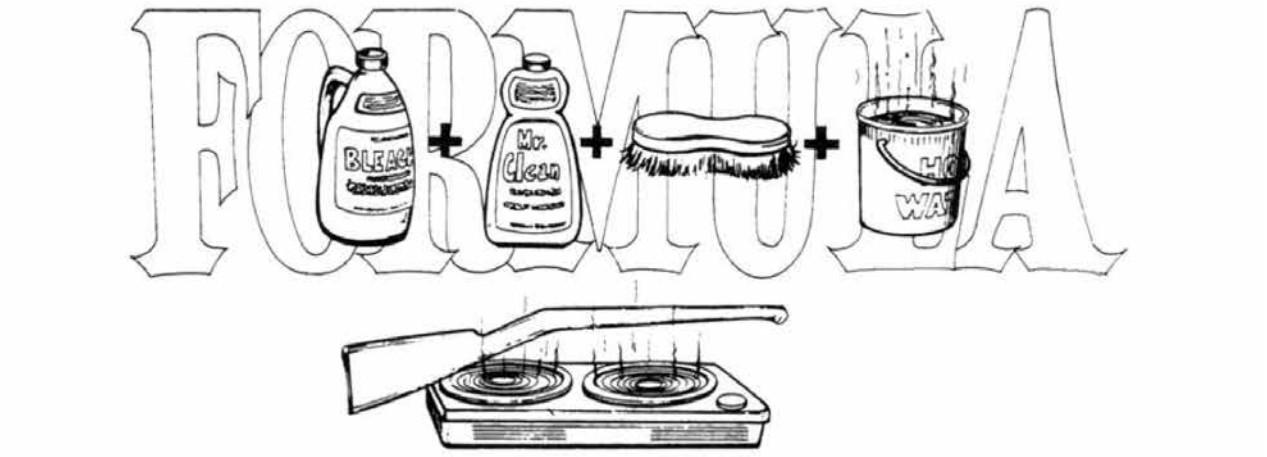


Figure 9: Proven formula that works well for removing any type of oil finish from gunstocks.

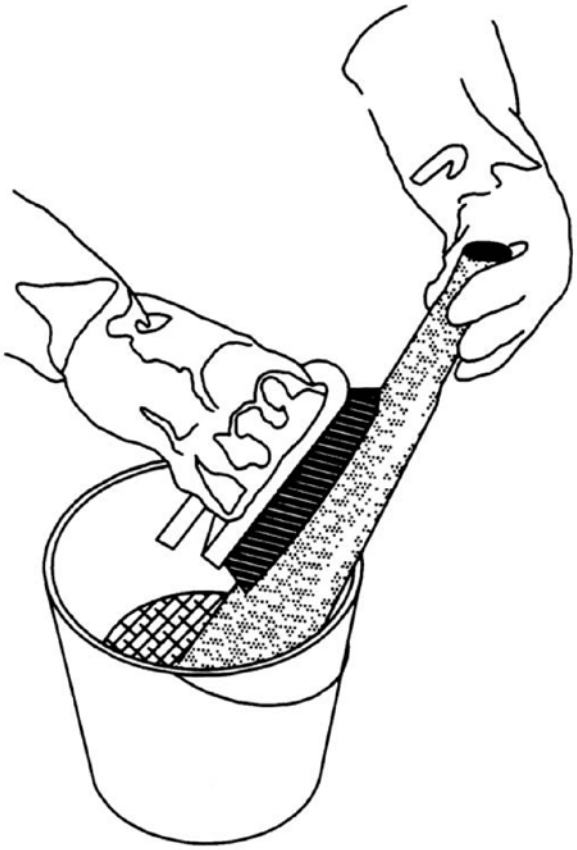


***Figure 10**: Using the solution of bleach, Mr. Clean®, and hot water, scrub the stock to be refinished for about five minutes. Be sure to wear gloves to protect your hands.*

recesses, and bolt recesses. In a pinch, they can also be used on flat surfaces, but they are best used on corners, curves, and other round or oval shaped areas.

Metal Oil Tank. In the days of strict oil finishing (considered by many to be the best finish available) a stock-refinishing job took weeks to complete, as a certain amount of drying time had to be allotted between coats. To speed the process up slightly, many gunsmiths constructed metal containers in which the linseed oil was heated, after which the stock was lowered into the tank to absorb all the oil possible on the first application. The heat, of course, opened the pores of the wood to allow oil to seep in. Modern methods permit only a few stocks to be finished this way, but to understand refinishing completely, every gunsmith should know how to use these tanks.

GENERAL REFINISHING

First, carefully remove the barrel/receiver from the wood, and then remove the buttplate, sling swivels, and any other metal parts, always being careful not to split or otherwise mar the wood in the process.

Once all hardware has been removed from the wood, you can use one of dozens of varnish and paint removers on the market to remove the existing finish. However, many gunsmiths find it best to use the proven method of scrubbing to get the old finish off. This method also automatically raises minor dents and dings in the wood during the process of removing the finish. A summary of the method is shown in Figure 9. In general, get a bucket of hot water and a scrub brush. Add ½ cup of bleach and ½ cup of Mr. Clean® to the hot water. Wear rubber gloves, and with a brush soaked with the solution, begin scrubbing the stock. Scrub for about five minutes, as shown in Figure 10, and wipe off any suds with a cloth. Then hold the stock over a source of heat to quickly dry the wood, as shown in Figure 11. Do not let the stock burn or get too hot; just heat it enough to dry the wood and to raise the grain.

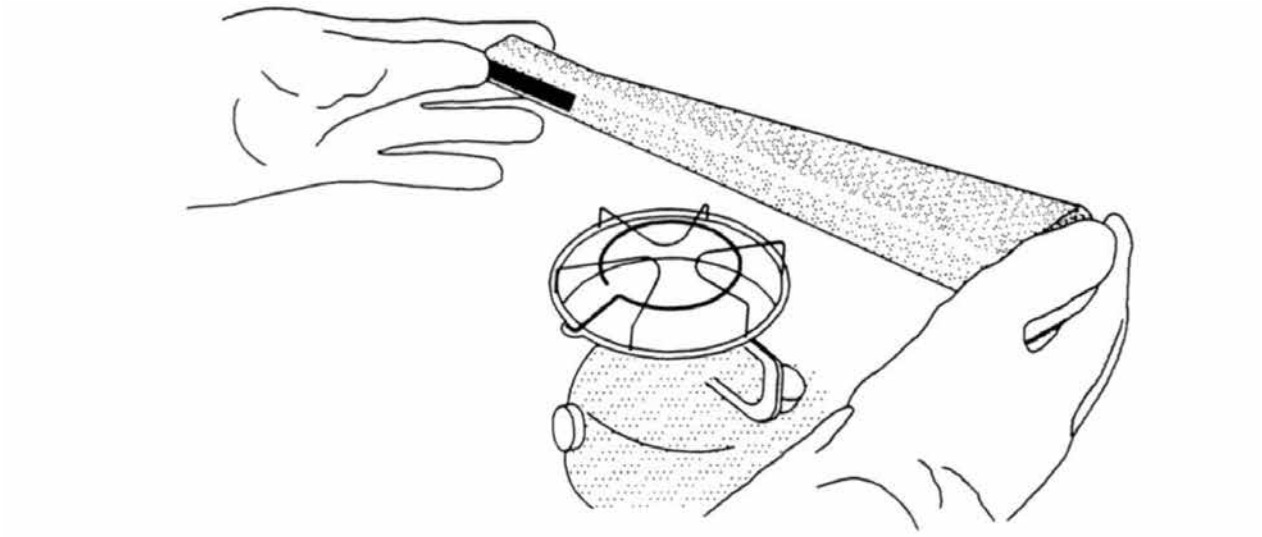


***Figure 11**: After scrubbing the stock, dry it over a heat source, but be careful not to scorch the wood.*

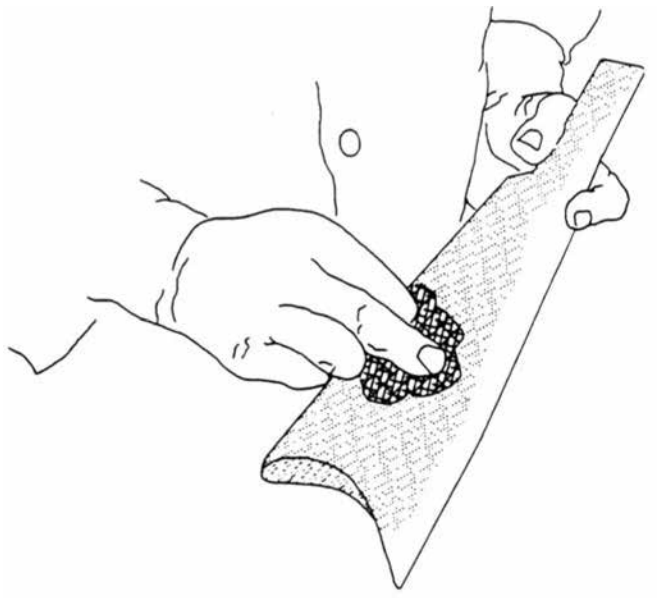


Figure 12: *After scrubbing and drying the stock, go over the wood with steel wool. Then repeat the entire procedure.*

When no more signs of moisture exist, take a piece of 00 steel wool and rub the entire wood surface down, as shown in Figure 12, cutting off all whiskers and removing more of the finish. Then go back and scrub the stock for about five minutes. Again, hold the wood over a source of heat until it is dry, and then again rub it down with steel wool. Repeat these operations until all the old finish has been removed from the stock.

Once most of the oil is removed from the gunstock, you will almost always have a few stubborn spots. These spots will usually occur around the buttplate, the trigger guard, and the receiver. Rather than scrubbing the entire stock, hold these difficult spots over a heat source until the oil begins to bubble to the surface of the wood, again being careful not to get the stock too hot. Then, quickly wipe the oil off the stock with a rag. Repeat this operation until all of the oil is raised to the surface.

With all the finish removed, carefully examine the wood for dents. Mark these with a pencil, and try raising them with steam as described previously. The steam will raise the crushed fibers in the wood. Repeat this operation several times until the dent rises flush with the surrounding wood surface. Again, be careful not to burn the wood.

Some stocks will be ready for final sanding with only two or three applications of the solution. Others may require more than 15 passes of scrubbing, heating, and whiskering with steel wool to get the surface in good shape.

To facilitate the removal of oil from the stock, you might want to purchase a small can of plain whiting at your local paint store and some type of grease solvent. Put a few ounces of whiting in a small jar and stir in just enough solvent so that the mixture can be spread on the wood with a paintbrush. Now heat the stubborn spots again, and when the oil bubbles to the surface, coat the area with the whiting/solvent mixture. If you work quickly before the solvent evaporates, it will penetrate deeply into the wood and dissolve most of the oil and grease it encounters. As the solvent evaporates, it brings the oil and grease to the surface of the wood; the oil and grease are then absorbed by the whiting on the surface.

When all of the old finish is removed, use several grades of sandpaper to smooth the surface. Start with a medium grade and work down to very fine. Then use steel wool (0000 fine) to polish the wood even more.

For bad dents and gouges, smooth them flush with the surrounding surfaces with a wood scraper, or fill in the dents. Remember, before you refinish any type of gunstock, you should remove the barrel and receiver, along with all metal parts, such as sling swivels, buttplates, and grip caps. This will make the entire stock readily accessible and prevent the metal parts from becoming scratched or damaged.

The old finish can be removed in many different ways, but the type of finish will dictate the best choice. For example, oil finishes are best removed as discussed above. Conventional "factory" finishes are best removed with a commercial stripper.

To use the stock finish stripper, first spread newspaper or another protective material beneath the stock to protect the work area, or hang the stock in a large cardboard box so that the spray from the can will be contained. Spray one entire side of the stock. Immediately, the old finish will begin to bubble, and in three to five minutes it will be penetrated enough to remove. Then wipe the surface clean with an old rag, followed by steel wool. If the first coat of finish remover does not remove all of the finish, apply another coat as stated above, until all of the old finish is removed.

If the stock being refinished has checkering or carving, a stiff bristle brush might be required to remove the finish from the crevices (Figure 13). Toothbrushes work fine for this purpose.

Before applying the new finish, the entire surface of the stock must be thoroughly cleaned with turpentine and allowed to dry. Any type of paint and varnish remover can also be used to remove gunstock finishes, but several applications are usually required. For stubborn spots, use a wood scraper, but be sure not to scrape over any checkering or carving.

One time-proven method to remove stock varnish is a solution of 3 level tablespoons of household lye to 1 gallon of boiling water. Rubber gloves must be used with this solution, as well as protective goggles or a face shield because any contact of the lye with the skin or eyes will cause injuries and perhaps blindness. Scrub the stock well with this solution using a stiff scrub brush, then rinse it thoroughly in clear water. Once dry, the stock is ready for finishing.

Once the old finish is removed, smooth the bare wood until the surface is as smooth as glass. One way to accomplish this is to wet the stock with water and then dry it over a source of heat, such as the kitchen range or heat lamps. This procedure raises the grain of the wood; once raised, steel wool is used to cut the wood fibers and smooth the stock. Apply water again and repeat the procedure just described. Continue this operation until the grain no longer rises after wetting and drying.

After the stock surface is as smooth as possible, some type of wood filler (and possibly stain) should be applied to the stock. One excellent brand is Birchwood Casey's Gunstock Sealer and Filler. This filler is used to prepare all types of gunstocks for final finishing. A clear sealer and filler, it allows you choose your favorite stain or leave the wood in a natural tone. This or some other filler should be applied to the stock, wiped across the grain with a rag, and left to dry for at least four hours — preferably overnight.

When the filler has dried sufficiently on the stock, go over the entire surface with a very fine grade of steel wool (0000) before continuing. Some gunsmiths prefer not to use filler in the checkered areas, because gumming will probably occur. If filler is used in these areas, be certain to use a toothbrush to clean out the crevices before it dries. You can use masking tape to cover the checkering before applying the sealer. The final finish will then leave the checkered areas a little lighter than the rest of the stock.

To apply most finishes, first wipe the surface with a tack cloth to remove all dust or other particles that would prevent the final finish from being completely smooth and free from foreign matter. Work in a clean, dust-free area for best results. Apply the stock finishing oil directly from the container to the stock, using your fingers or a clean cloth to evenly spread the oil with the grain of the wood. Allow the first coat to dry at least two hours or as directed by the oil's manufacturer. When the first coat is dry, sand the entire surface very lightly with 00 steel wool; then apply another coat of stock finish. Repeat these steps until the desired luster is attained; this will usually take three or four coats.

This is one phase of refinishing that cannot be hurried. If new coats of finish are applied before the preceding ones have dried, you will end up with a gummy mess, requiring that the entire stock be restripped and the refinishing process started all over again.



***Figure 13**: If the gunstock has checkering, a stiff bristle brush (like a toothbrush) might be required to remove the old finish.*

When the final coat has dried completely (for at least 24 hours), a good gunstock wax should be applied to the stock surface to protect and dress up the final finish. Another coating is Birchwood Casey's Stock Sheen, which is a good final polish for finishing gunstocks. Just apply it directly from the bottle; it requires no hand rubbing, no rottenstone, and no pumice. It also protects the finish against handling and weather.

Should a satin sheen be desired, rub the final finish with rubbing compound or rottenstone to dull the glossy finish.

Gunstock finish for checkered areas is usually applied with a soft-bristle toothbrush and rubbed with the toothbrush until the finish takes hold. The same is true for carvings and other decorations on the wood. If you have followed all these instructions, the new finish should look at least as good as the original.

SELF-TEST QUESTIONS

Please check your answers on page 16.

5. **What type of device is recommended for getting into the crevices of checkering patterns to remove the old finish?**
6. **What can be added to hot water to make a good finish remover for oil-finished gunstocks?**
7. **What type of finish remover is usually best for removing factory finishes from recently manufactured gunstocks?**
8. **When using the hot water, bleach, and Mr. Clean® solution to remove gunstock finish, how hot should the stock be heated between applications?**

Answers to Self-Test Questions

1. Steam the dents until they are flush with surrounding areas.
2. Heavy rubber bands.
3. Belt/disk sander.
4. False. They will have to be filled with wood or other filler.
5. A stiff bristle brush, such as a toothbrush.
6. Household bleach and a cleanser like Mr. Clean®.
7. Commercial gunstock finish remover.
8. Just hot enough to evaporate the water from the wood, but not so hot as to scorch the wood.

Lesson Questions

THIS IS LESSON NUMBER 2190.

Make sure you print your name, student number, and lesson number in the space provided on the Lesson Answer Form. Be sure to fill in the circles beneath your student number and lesson number.



REMINDER: A properly completed Lesson Answer Form allows us to evaluate your answers and send the results and additional study material to you. Do not hold your Lesson 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 exam online at www.sdi.edu, click on the *online exams* tab.

1. **What are the three basic "tools" for raising dents in a gunstock?**
   a. Commercial stock finish remover, chisel, and gouge.
   b. Hot water, bleach, and Mr. Clean®.
   c. Water, cloth, and soldering iron/gun.
   d. Belt sander, orbital sander, and belt/disk sander.

2. **When a severe gouge is present in a gunstock, which of the following is a good way to cover it?**
   a. Use an inlay.
   b. Use a soldering gun to raise the wood fibers.
   c. Use a drawknife to smooth the area.
   d. Use a strong bleach to blend the gouge in with the rest of the wood.

3. **When repairing a break at the pistol grip on a rifle stock, what should be used to strengthen the repair besides epoxy?**
   a. A birch dowel coated with epoxy inserted through the break.
   b. Strong rubber bands.
   c. Stovepipe wire.
   d. C-clamps.

4. **When selecting a piece of replacement wood to repair a broken buttstock toe, which of the following is important to consider?**
   a. Select wood with a different grain so that the area of the repair can be easily detected.
   b. Select a piece of wood with a grain that closely matches the original stock and with the grain running in the same direction as the original.
   c. The wood should be lighter in color, so that wood stains will take better.
   d. The wood should be darker than the original.

5. **Two items that can be used to tightly secure replacement pieces of wood in a gunstock repair while the epoxy is drying are**
   a. Krazy Glue and household bleach.
   b. Fingers.
   c. Iron wire and heavy rubber bands.
   d. A rifle sling tightly wrapped around the break.

6. **What is the recommended diameter of wooden dowels used to repair broken stocks at the pistol grip?**
   a. ¼inch.
   b. ½ inch.
   c. $^3/_8$ inch.
   d. ¾inch.

7. **What should be done before any finish is removed from a gunstock under repair?**
   a. The entire rifle should be soaked in turpentine.
   b. The stock should be recheckered.
   c. All metal parts should be in place on or in the gunstock.
   d. All metal parts should be removed from the gunstock.

8. **When there are still areas with heavy oil on the gunstock after most of the finish has been removed, what substance can be used to remove the oil from these areas?**
   a. Inletting black.
   b. Whiting.
   c. Gun oil.
   d. Bore cleaner.

9. **What is one homemade formula that can be used to remove varnish from old gunstocks?**
   a. Three level tablespoons of household lye to 1 gallon of boiling water.
   b. One tablespoon of nitric acid to one pint of distilled water.
   c. Gun oil, bore cleaner, and household bleach.
   d. Mr. Clean®, gun oil, and bore cleaner.

10. **What tool is normally used to apply gunstock finish to a checkered area on the gunstock?**
   a. A wire bristle brush.
   b. A soft-bristle toothbrush.
   c. A scrub brush.
   d. A cotton swab.