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# GENERAL INSTRUCTIONS FOR ASSEMBLING THE HAWKEN RIFLE KIT (Dixie Gun Works, Inc., Union City, Tenn., 38261)

The Hawken rifle held an important place in the making of American history of the 19th century. In the hands of bold, adventurous men it helped mightily in the exploration and settlement of the West.

By the 1830's, our country was experiencing growing pains and those who pushed westward into the plains found the need for a weapon that would shoot long distances accurately, hit hard, and take rough usage. The graceful Kentucky rifle was too small acaliber to match against the buffalo and grizzly bear, and it was too long to handle easily on horseback.

Jacob and Samuel Hawken, gunsmiths in St. Louis, Missouri, supplied the rifle that met these needs. At first, the Hawken rifle was full stocked like the Kentucky, but later it was made half stock as this model is. The barrel was made heavier to take over 200 grains of blackpowder and the caliber was .50 or better. The overall length of the Hawken was shorter than the Kentucky and the stock was stouter and not as graceful, but much sturdier to take hard wear. In the hands of the expert, it was reported to bring a buffalo down at 600 yards. The plains Indian respected the Hawken too, since his horse could be shot from under him at such a distance that the rifle could be loaded and fired at him several times before he could meet his foe on foot.

Although it kept the Hawken name, many gunsmiths made the plains rifle as time went on, because the demand was great. Among the plainsmen who owned a Hawken were such illustrious names as Kit Carson and Jim Bridger. And now a fine replica of this rifle can be yours for target shooting, hunting, or your collection.

Before you begin putting your kit together, however, may we suggest that you read these directions carefully and understand what you must do at each step. Speed is not as important as good workmanship. If you'll bear this principle in mind, you will be as proud of your Hawken as the men who owned the originals.

#### LENGTHENING THE TANG AND INSTALLING THE BOLSTER

Although not essential for the operation of the Hawken rifle, the tangs on the original breech plugs were much longer than on the bolster supplied in the kit, and were fastened to the stock by two bolts instead of one. So to make your rifle more authentic, the tang should be lengthened by spot or gas welding a piece of steel roughly 1/2" wide by 3" long by 1/8" thick to the end of the bolster tang as shown in Figure 1. This job can be done by a commercial welder. If, however, you prefer to do the job yourself, an AC welder set at 80 ampheres using Hobart No. 13-3/32" rod can be used.

Once fastened into place, the extension should be shaped as shown in Figure 1, using metal files. The rounded end should take the second bolt which will be described in a later step. The forward end of the extension should be worked into the shape of the original tang end which is about 3/8" wide and 1/4" thick.

Before installing the breech plug, measure off 35-1/4" from the muzzle of the barrel and using the square, mark a line around the barrel which is at a right angle from the barrel flat. Then cut the barrel off carefully at the line with a hacksaw. Figure 2 shows a cutaway of the shortened barrel to reveal the proper threading of the bore. This step is accomplished using a 5/8-18 tap carefully turned into the rear of the barrel bore for about 3/4". The bolster can then be screwed into place. The top flat of the bolster must match one of the barrel flats exactly and the bolster end should fit snugly against the barrel. If adjustments must be made to accomplish this, unscrew the bolster and carefully file or grind off the barrel end until the bolster can be



screwed into its proper place. A fixed grinding wheel with a ring to hold the barrel flats at right angles to the wheel is the tool of choice.

# SHAPING THE STOCK AND INLETTING THE BARREL

Rough shaping the stock with three cuts (Figure 3) can be done at this point. Follow the dimensions of the drawing in scribing the line on which to saw. The curve at the wrist of the stock should follow the curve at the top flat of the tang. Remember that farther along in this article the cheek piece extends to the left of the center line of the barrel which means that the barrel must be on the right hand side of your stock blank. Determine the correct position of the barrel to the right of the stock blank, hold the bolster against the right side of the stock and its approximate final position and scribe a line on your stock that will be the center line of your barrel.

Two methods of inletting the barrel are described. The first (Figure 4) is accomplished with a bench saw with an adjustable disc blade. Study diagrams 4 and 5 to thoroughly understand the saw cuts in making the roughed-out barrel channel. Next, measure off 17-1/2" on the stock from the rear of the barrel and trim your forearm to this length. This will be from the dotted line in Figure 3. After the four cuts are made, saw off the 17 $1/2 \ge 1/2$ " strip (Figure 3) and the piece at the wrist. Extra wood in the barrel channel may be removed with chisel and metal drill (Figure 5). Without a bench saw, the entire channel can be cut with drill and chisel. Try the barrel in the channel from time to time to assure a close fit of wood to metal. Figure 6 shows an invaluable tool to smooth the channel to exact dimensions. It is made by grinding off the edges of the flat file to make the file 7/16" wide. Then by heating the shank with a blow torch it can be bent to allow easy filing of the channels. With the shanks set in a dowel it can work wonders.

## INLETTING THE BOLSTER AND DRILLING THE RAMROD HOLE

Figure 7 shows how the top of the stock blank must be inletted to take the bolster and tang. Start by inletting the deep portion of the tang behind the breech plug (A) using a small chisel and small flat file to smooth the sides of the cut. As the forward tang well gets deeper, the bolster will come to rest on the right edge of the barrel channel (B). With a sharp knife and a half round file gradually seat the bolster into the stock. It may be necessary to give attention to points A and B alternately until the tang proper lies flat on the wood.

Then outline the tang with a pencil and



using a flat 1/2" chisel, curved chisel, or appropriate wood carving knives, inlet the tang until the top flat of the bolster and tang are even with the wood (C). It is always better to underestimate the amount of wood you need to remove. The sides and bottoms of the cut can always be smoothed and enlarged by using a small flat file. When barrel, bolster, and tang are properly seated in the stock, cut the steel rib to a length of 18" with a hacksaw. This rib can be fastened to the underside of the barrel, starting where the fore-end of the stock ends, in several ways. One way is shown in Figure 8 using four small bolts. The barrel is only penetrated for 3/16" and tapped to take the bolt thread. But equally good results can be obtained by using epoxy cement between the rib top and the underside of the barrel and clamping the two together in the right position for 24 hours, or placing solder between the rib and barrel and heating the rib with a blow torch.

With the rib in place, mark the spot on the stock fore-end where the ramrod hole should be started in the stock. Since the hole is 15" deep in the stock, it will be necessary to weld a length of steel rod to a 3/8" bit to make the bit 16" long. Using a 3/8" electric drill, bore a hole into the stock 15" long and parallel to the barrel channel. When starting to drill be careful to make the first inch straight to prevent later drift.

### SHAPING THE STOCK AND INSTALLING THE BUTT PLATE

For easier handling of the stock, outer rough cuts can now be made. Figure 9 shows three cuts that will further reduce the size of the stock. To mark the butt curve, first hold the butt plate against the side of the stock at the butt end. The top of the iron butt plate should be level with the top of the stock with the bottom end extending to the lower corner of the stock butt (see Figure 11).

With a pencil, mark the inside curve of the butt plate on the stock and saw it out. A keyhole saw or bandsaw is best for this job. Other than the butt curve, leave the stock butt at its original size for the moment.

Next, on the top of the butt, mark a line showing the center of the barrel channel (Figure 10). By holding the butt plate in the curve with the top of the plate even with the top edge of the stock, the top butt cut can be marked (dotted line Figure 9). Saw off this small piece which is about 3/8" from the top of the stock butt. The butt plate will sit in proper position although some rasping may be necessary to assure close fit of metal to wood.

Position the butt plate in the curve so the center of the top arm is aligned with the barrel channel line. Drill two holes in the metal butt plate as shown in Figure 11 and fasten the plate to the stock with 3/4" steel screws. On the side of the stock butt, mark off the characteristic Hawken Beaver-tail cheek rest as shown in Figure 11. Then gradually remove wood from the stock butt with rasp and file. The wood butt should be rounded, on top to match the top of the butt plate and present a smooth line from butt plate end to the comb. The bottom, although flatter, should match the butt plate and meet the wrist in a smooth curve. Both sides should match the butt plate edge and only the left side shown in Figure 11 has the 3/8" projection for the cheek piece.

A cross section shows how to shape the butt stock at this point. After rough cutting with rasp and file, the butt portion can be sanded smooth.

#### INSTALLING TENONS AND SIGHTS

Since the tenons that hold the barrel to the stock and both front and rear sights are installed the same way, they are included in the same instructions. Install the tenons first. Later, when you have had practice, front and rear sights will be easier to put in and will look better.

It will be necessary to make your own tenons from steel stock about 3/16" to 1/4" thick. With a hacksaw, cut a rectangle 7/8" by 5/16". Mark each end with 45° angles facing each other using a square or protractor. Then saw and file off each end to form the shape in the upper portion of Figure 12. The wide end of the tenon should be dovetailed to admit the barrel easily in the depth and width of the cut. With the wide end of the tenon set on the bottom flat of the barrel, make a mark on the barrel at each end of the tenon. Then 1/8" inside each mark on the barrel, mark a line across the barrel flat using a square to be sure the lines are parallel and at right angles to the edge of the barrel flat. Cut away some of the barrel between these two lines by making several hacksaw cuts as close together as possible and the depth of 1/8 of an inch (Figure 12). Carefully file the remaining metal until the bottom of the cut is flat.

To undercut the slot ends, use a triangular file ground smooth on the bottom side as shown in Figure 13. Test the undercut from time to time with the tenon, and file only as long as it takes to start the tenon into the slot. Once started, drive the tenon into place in the middle of the bottom barrel flat and straight with the barrel. Secure it in place by making punch marks at both ends and both sides of the tenon as close to the tenon as possible.

Front and rear sights are installed the same way. The rough cast brass front sight must be prepared by filing a dovetail front and back of the base with a triangular file. Once front and rear sights are in place in the center of the barrel, file off the protruding sides to be smooth with the flat surfaces of the barrel. Figure 14 shows the proper location of sights and tenons on the barrel.

## PINNING STOCK TO BARREL

Since the wedges are rough cast, they may be filed smooth which will facilitate their insertion. First, mark a line on the right side of the stock at the point where the breech plug meets the barrel (Figure 15). Unscrew the breech plug and put the barrel back into the channel on its side with the tenons protruding to the right and the rear of the barrel at the line drawn on the stock.

Now mark the full width of the tenon slots on the stock, remove the barrel and draw lines through these marks into the barrel channel and on the right side of the stock. Now, inlet the tenons into the bottom of the barrel channel. Exact position for the tenon slot can be determined by using oil and lampblack on the tenon bottom and pressing the barrel into place in the stock with the breech plug screwed in.

With a small knife, remove just enough wood to allow both tenon and barrel to fit snugly into the stock (Figure 16). Next, with the barrel clamped securely into the stock, use a square to measure and mark a line on the stock exactly 1" from the top barrel flat. Draw the line on the stock through the lines that show the inside tenon slot.

Then, with a 3/32" drill, make several holes side by side within the guidelines as shown in Figure 17. The drill should pass completely through the tenon slot and the stock.

The wedge slot can be enlarged and smoothed with a small flat file to take the wedge. Wedges can now be pushed in from the right side to hold the barrel to the stock. Although the wedges have long ends that protrude from the left side of the stock, do not cut them off until later when the stock is shaped further and wedge plates are installed.

#### FITTING AND INLETTING THE LOCK

To fit the bolster to the lock plate, remove the breech plug from the barrel. Hold the right side of the bolster against the inside of the lock judging where the nipple will be centered under the hammer. By close observing, you will understand the approximate position of how and where to cut away the lock plate so the bolster can be fitted down into the plate.

Going back to do the same thing again, mark the width of the bolster on the top of



the lock plate while held in the above-mentioned position. Now strip all parts from lock plate and hold it against the stock so that the top of the plate is touching the underside of the bolster. Carefully file away the lock plate so the lock will fit farther up to the bolster with each cut. Do not file too much. Always test every so often to see if your hammer is coming close to fitting the nipple on center. It might be possible that you will need to cold bend the hammer left or right to make it fit the nipple better.

After you are sure that the lock plate has been inletted and filed away for the bolster and that the hammer will hit the nipple on the bolster, strip the lock of all parts again and scribe the outline of the lock on the right hand side of the wood stock.

Cut around the lock plate line slightly undersize, with small chisels to the proposed depth of the lock plate. Remove the inner wood with a small gouge or chisel. For round ends use a round edge chisel. The area can be scraped or filed smooth.

Next, replace the internal parts and continue inletting. Best results are obtained by inletting parts in the order they protrude. Mark their position on the stock using oil and lampblack and cut away until they fit freely. Figure 19 shows the inletting procedure. By placing each individual part one at a time on the lock plate and inletting for this part in order, best results will be obtained. This order of inletting is bridle, tumbler, sear, sear spring, and mainspring last. The hole for the sear arm (No. 1) should be with a 1/4" drill and bore 1/8" deeper than the length of the sear arm. Enlarge the hole for the up and down motion of the sear. Remove only enough wood so that each part moves freely.

#### SHAPING STOCK, INLETTING SIDE PLATE, AND INSTALLING LOCK BOLT

The flat sides of the stock around the lock can now be shaped with files. First, be sure that both sides of the stock around the lock are equal width which will be about 1/4" wider on each side than the barrel (Figure 20). Figures 20 and 21 will give you a very excellent idea of how to shape the wood around the lock plate. Using a half round file, take out a trough around the outside edges of the penciled lines no more than 1/16" deep. With rasp and file take down the foreward end to 3/16" starting at the trough, extending to the stock nose on both sides. Then take the rear area down to a smooth curve that blends with the wrist. Round off the upper corners of the stock over the lock to make the stock U-



shaped in cross section. Then sand off all areas until smooth.

Now install the lock bolt shown in Figure 20. First, locate the position of the hole to be drilled by outlining the position of the side plate on the left side of the stock. Then mark the position of the bolt head. Remember, when drilled, the bolt should pass through the stock, through a hole in the tang reinforcement and screw into the upper reinforcement portion of the lock plate.

Remove the hammer and find the spot on the lock plate exactly opposite the bolt mark on the left side. Center punch the lock plate with the lock clamped in position. Drill from right to left through the stock with a No. 21 drill. Remove the lock plate and remount the hole in the stock and tang with a No. 9 drill so the bolt will pass through. Then tap the hole in the lock plate from the inside with a 10-32 tap.

Next, inlet the side plate on the left side of the stock (Figure 21), bevel the edges slightly to the underside of the inlet to assure a tight fit.

The plate may be smoothed with 000 sandpaper before installation and when in place should be level with the side of the stock.

Now insert the bolt through the side plate and stock and screw it firmly into the lock plate hole. Cut the bolt to length so the end will be flush with the lock plate.

# INSTALLING SET TRIGGER, TRIGGER GUARD, AND TANG BOLTS

The set or double trigger is one mark of a true Hawken. It provided a hair trigger for more accurate shooting with a heavy rifle. Remove the lock after observing exactly where the sear goes through the wood and where it will engage later on with the trigger. Carefully mark this position with a pencil that will be in a position underneath the trigger guard. Determine the center line of the double set trigger plate. Also determine the front to rear position of the double set triggers so that the rear trigger will just touch at its extreme length of the sear after it is inletted into the stock.

After your correct position is determined accurately, outline your trigger plate and inlet with chisels, files, and drills. When properly inletted, the plate may be about 1/16" below the surface of the underside.

Drill a hole in the rear of the trigger plate and fasten the mechanism in place with a steel wood screw (Figure 22-A).



Inlet the trigger guard so it will be flush with the stock underside and so the forward reinforced portion will be directly over the forward hole of the trigger guard (Figure 22-B). This entire installation may not move along very rapidly and may require that you replace the lock to be certain the trigger mechanism is moving freely enough to quickly disengage the sear arm from the sear.

To install the forward tang bolt, use the hole already drilled in the trigger plate as a guide for a No. 21 drill as you penetrate both the stock and tang from the underside to the top. Now clamp the trigger guard in place and put the No. 21 drill through the same hole from the top and cut into the reinforced portion of the trigger guard, clamp them together with the two holes aligned and thread with a 10-32 tap.

With the trigger and guard out, ream the hole in the tang and stock with a No. 9 drill and countersink the top of the tang hole. Now replace all parts and screw them tightly in place.

The rear bolt is installed much the same way, running from the center of the circle at the tang end to the rear trigger guard plate as shown in Figure 23. This way of attaching the trigger guard strengthens the wrist of the rifle an enormous amount.

### INSTALLING THIMBLES AND MOULDING THE NOSE CAP

Figure 24 shows in detail at what spots the thimbles are placed. Start by shaping the stock at the nose by cutting away a jog 2" back and exposing the upper half of the ramrod channel. Then slope the rear of the cut (D) with a file to correspond to the curve of the rear thimble tang.

With a small straightedge chisel, cut a V-shaped channel 1" from the stock nose to take the rear thimble and gouge a rectangular hole at the bottom of the cut to take the lug. Oil and lampblack are very useful at this stage to mark the "V" so the round thimble can be inletted deeper and correctly.

When the tang can rest on the bottom of the stock, outline it flush with the outside with knives, chisels, and small files.

Before pinning the rear thimble, make a test with the ramrod to be sure there are no blockages in the ramrod hole when the thimble is in place.

Measure the distances between the bottom of the thimble and the center of the lug and between the front of the thimble and the lug center. Clamp the thimble in the stock and using these measurements, mark the stock on the right side where the hole for the pin will be drilled. Then drill a hole through the lug



with a 1/16" drill and pin the thimble in place with a small steel finishing nail.

Forward thimbles can be fastened to the steel rib by soldering or by using epoxy cement and clamping them in place. About 6" separates each thimble as shown in Figure 24. However, to accomplish this, the top flange should first be filed away so the round thimble is flush with the under curve of the rib.

Since a proper nose cap is not available, Figure 25 suggests a method of casting your own. First shape the nose of the stock as shown in 25-A. You may stop at this point if you do not wish to cast the nose.

Figure 25-B shows a nose mould made by carefully cutting a small cardboard box to the dimensions of the underside of the stock nose, including a portion of the rib and running back to a spot described by the dotted line in 25-A. Fasten the box in position on the gun with masking tape around all edges where the rifle nose meets cardboard. Then pour in the box a creamy consistency of plaster of Paris and allow it to harden. After the mould is solid, remove it from the nose and shape the wooden nose to correspond to 25-C so the nose cap will stay in place. Notice that 1/16" is taken off all outer surfaces of the stock.

Next, put the gun back into the plaster mould using the rear thimble and the rib as guides for proper placement. Wire the mould tightly to the gun and pour moulten printers type lead into the cavity. When the lead has cooled, remove the mould and file off all rough edges and obstructions to bring the nose back to the shape of 25-A.

### DRESSING UP THL RIFLE

Four wedge plates 1-1/4" long can be cut from a piece of 25 gauge galvanized steel carried at most hardware stores. By cutting with shears and filing, they can be shaped oval. The slot for the wedge can be drilled and filed out and holes at either end should be drilled to take 1/4" steel screws.

To remove the galvanizing, the plates should be dipped in a solution of one part sulfuric acid and four parts water. When doing the operation, use care not to let the solution touch skin or clothing and dip the plates in a solution of one tablespoon of bicarbonate of soda to 1/2 cup of water before drying off the plates to neutralize the acid.

Then inlet each plate into the stock to be flush with the wood surface and pin in place with the screws. The plates may have to be bent to conform to the rounded stock surface. Although a steel cap box is not essential, one can be placed in the right side of the butt stock. The rounded end of the cap box is



toward the butt plate. Outline the box after placing in dead center on the butt stock and about 1-1/2" forward of the butt plate. Inlet the spring first, then the plate. The cap box cavity should be 5/8" deep. When the plate is flush with the surface of the wood, fasten it to the stock butt with 1/4" steel screws through the holes provided.

The ramrod may be solid color, dark stained or can be given a dark spiral by turning the rod in front of a blow torch flame. The length of the rod is determined by thrusting into the barrel and cutting it off at the muzzle. When you have completed the rifle, remove all rough spots and tool marks by scraping the wood with a razor blade, sanding, and using steel wool to get a smooth surface. Metal parts should be smoothed with steel wool and fine emery paper and browned.

A browning solution is available at Dixie Gun Works and does quite well. Since the

Hawken was of straight-grained maple and a real work horse, the wood finish should be dark. Dixie has antique stain too. Or, if you prefer, brush on a solution of one part nitric acid to four parts water and let dry. Apply heat to the surface just until the wood turns red. Do not burn. Neutralize remaining acid by painting the surface with the soda solution described above. Then paint on several coats of stain made of 1/2 teaspoon of potassium permangenate in an ounce of water and allow to dry. Get the color as dark as you can then coat with boiled linseed oil and rub lightly with steel wool. Rub only until the finish is a shade darker than desired. Then allow to dry. To put on the final finish, rub the dried surface with the hands. Several additional linseed coats can be put on the same way, dried and rubbed until a beautiful finish is obtained (see Figure 26).



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