

Tuning The Caplock Revolver

TUNING PROVIDES SMOOTH, reliable operation of the caplock revolver, which in turn promotes better shooting. A revolver can be tuned in a number of ways. First, the trigger should have a crisp, clean letoff with reasonable weight of pull—not a “hair” trigger, but a safe one—usually about 2.5 pounds. Target pistols, especially those with double-set triggers, may have a much lighter letoff. But whether target or field, the goal is the same—a good trigger to enhance shooting ability.

Second, the revolver should load easily, without too much lead shaving on the lip of the cylinder chamber. A tiny circle of shaved lead does not destroy accuracy, but obvious slicing can be a problem. A well-tuned revolver exhibits little or no lead shaving.

Third, the timing should be correct, so the gun’s moving parts are synchronized. When the hammer is cocked, the movement should feel smooth and clean. The cylinder should be properly aligned, so the projectile enters the barrel’s forcing cone accurately. These and many other features of caplock revolver tuning need to be understood by the competent black-powder hobby gunsmith before beginning work.

Tuning is done on both new, finished revolvers and those built from kits. Original revolvers are not candidates for tuning due to their historical and collector value; however, if a shooter insists, it can be done. Normally, an original revolver has been “worked in” so thoroughly that parts are self-polished. In theory, a modern replica revolver may eventually work in through long service, but tuning puts things in order right away, plus it improves aspects of the revolver that no

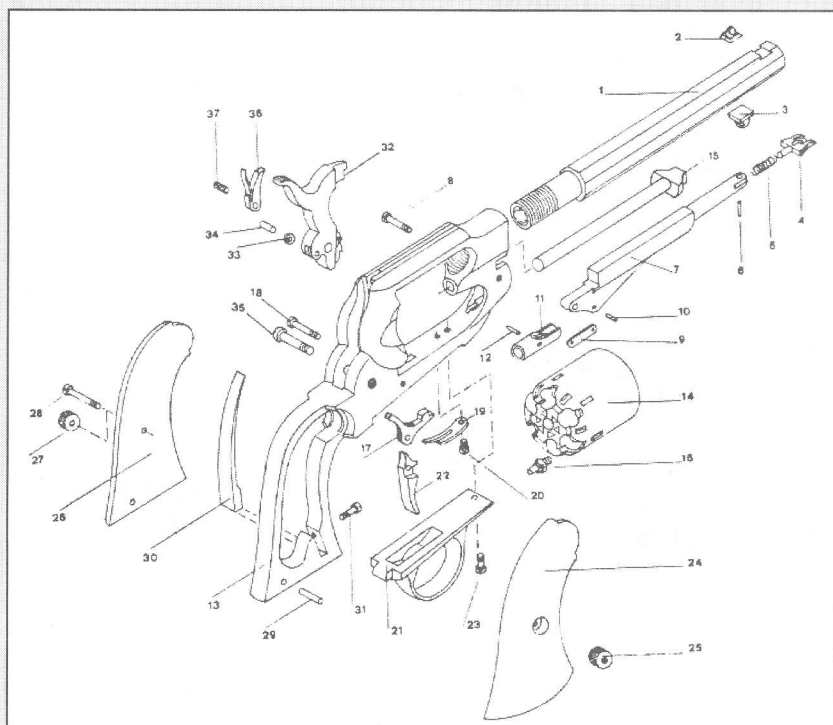
amount of working in will cure, such as shaving of the lead projectile, alignment of the cylinder and hardening of certain lock parts.

The hobbyist may wonder why a new revolver, fresh from the factory or built from a kit, would require tuning of any kind. The vast majority of new revolvers are well-made and of high quality, but if hand-tuned at the factory, the added cost would drive the price out of the range of many buyers. However, the hobby gunsmith can do his own tuning, making his revolver all the better for absolutely minimal expenditure of time or money. Plus, tuning will give the hobbyist a better working knowledge of his newly acquired gun.

A few tools are required for tuning the caplock revolver: a good set of gunsmithing screwdrivers, just as called for in so many other projects; stones for polishing, such as a medium Arkansas and a hard Arkansas; abrasive cloth or 400- and 600-grit wet/dry sandpaper; chamfering tool; vise; power hand drill; and 4-inch smooth mill file. Also needed are a wooden dowel rods, one very close to the bore size and another one for polishing chambers. The latter can be slightly smaller in diameter than the former, and it should have a slot cut into the end of it.

Tuning a blackpowder caplock revolver is an interesting process, and one that can be accomplished with a minimum of time, tools and handwork. It is an excellent Kitchen Table Level project that offers the possibility of great reward and satisfaction. Furthermore, after doing the job a few times, a hobbyist can become quite proficient at this type of gunsmithing, making him an expert caplock revolver tuner.

Correcting Revolver Timing



- 1 Barrel
- 2 Front Sight
- 3 Loading Lever Retainer
- 4 Loading Lever Latch
- 5 Latch Spring
- 6 Latch Pin
- 7 Loading Lever
- 8 Loading Lever Screw
- 9 Link
- 10 Link Pin
- 11 Rammer
- 12 Rear Hammer Pin
- 13 Frame
- 14 Cylinder
- 15 Cylinder Pin
- 16 Nipple
- 17 Cylinder Bolt
- 18 Cylinder Bolt Screw
- 19 Trigger & Bolt Spring
- 20 Trigger & Bolt Spring Screw
- 21 Trigger Guard
- 22 Trigger
- 23 Trigger Guard Screw
- 24 Right Grip
- 25 Right Grip Nut
- 26 Left Grip
- 27 Left Grip Nut
- 28 Grip Screw
- 29 Grip Pin
- 30 Mainspring
- 31 Mainspring Screw
- 32 Hammer
- 33 Hammer Roller
- 34 Hammer Roller Pin
- 35 Hammer Screw
- 36 Hand & Spring
- 37 Hand Pivot

Tools

Chamfering Tool
 Drill Press or Hand Drill
 Forcing Cone Reamers
 Smooth Mill File, 4-inch

Supplies

Arkansas Stones, medium and hard
 Sandpaper, Wet/Dry 400- and 600-grit
 Small Box for Parts
 Wooden Dowel Rod

Examining the Gun

Be certain that the revolver is unloaded before doing anything. Bring the hammer back to the fully cocked position. The cylinder bolt should fall into place to lock the cylinder at the same time the hammer engages the full-cock notch. That is what timing means—synchronization. If the cylinder locks up prematurely, and the hammer has to be forced to reach full-cock, the hand is too long and must be carefully shortened. This problem may occur on a new gun, or a gun that is fitted with a new

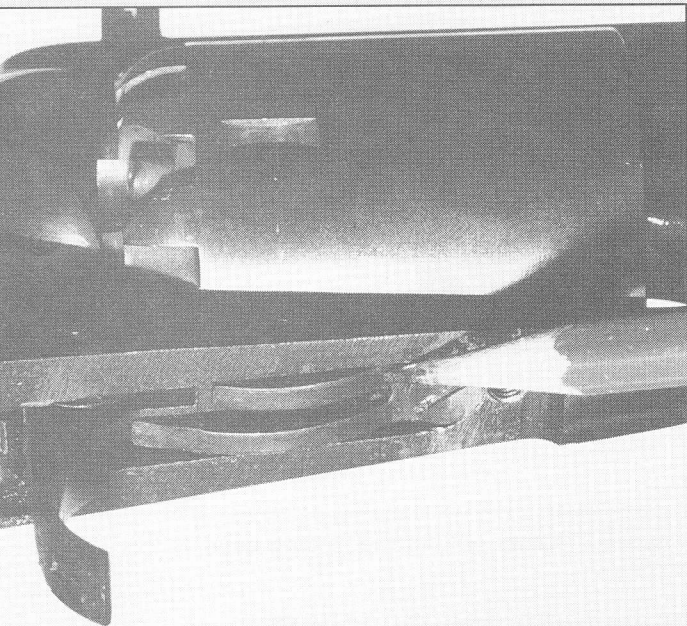
hand. The cure is a matter of adjusting the length of the hand to promote proper timing.

Adjusting the Hand

Careful polishing with a stone can slightly shorten a hand that is too long. Of course, it is impossible to add length to a hand that is too short, which can also be a problem. If the hammer reaches full-cock, but the cylinder is not rotated far enough to lock the gun into battery (firing mode), then the hand is too short. The only cure is to replace the hand with a longer one, and it may have to be polished for a perfect fit.

Checking the Cylinder Bolt

Be certain the cylinder bolt spring operates correctly, so the bolt locks the cylinder. As the hammer is cocked, the bolt should quickly release the cylinder, while not touching the cylinder again until just before it falls into place, locking the cylinder for the next shot. If the cylinder bolt does not function correctly, check to ensure it is not broken. Then, exam-



The cylinder bolt spring must be checked to ensure proper revolver tuning.



Checking the loading lever for proper alignment with the cylinder chamber.



Polishing the cylinder bolt after it was removed from the revolver.

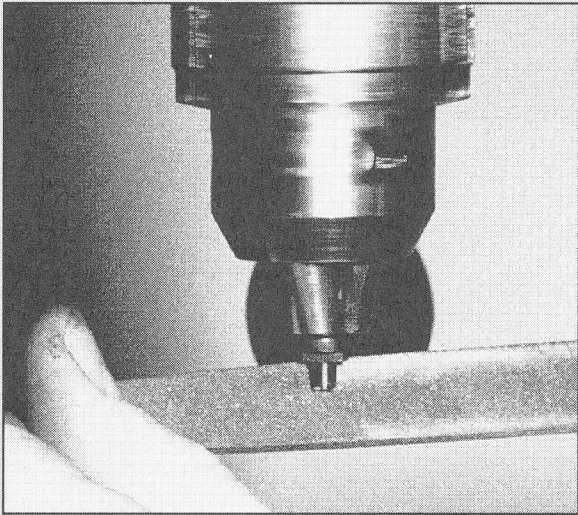
ine the cylinder bolt spring and the section of the hammer that actuates the bolt to be certain they are not damaged. If the cylinder bolt does not function properly, odds are one of these parts are broken and must be replaced.

Checking the Loading Lever

Ensure the loading lever works properly. Set the revolver on half-cock, rotate the cylinder to align with the loading lever, and then work the lever so the rammer falls into the cylinder chamber. The rammer should cleanly enter and depart. Anything less means a problem. The usual cure is a new rammer, as it may have become damaged. Loading lever and rammer problems are rare, but this checkup is another aspect of tuning that must be accomplished for a complete job.

Chamfering Nipples

Hand chamfering the nipples of the revolver will provide a bevel on the cone (end) of the nipple so caps fit snugly. In fact, the chamfered nipple can promote better ignition if the nipple was peened over, preventing a snug fit of the cap on the cone. Also, the chamfer provides a better angle for cap debris to escape from the nipple cone after detonation. Excess cap debris can cause cylinder lockup. A fired cap that clings to the cone of the nipple is virtually rotated with the cylinder, ending up between the frame and the cylinder. It's better to have the fired cap fall away when

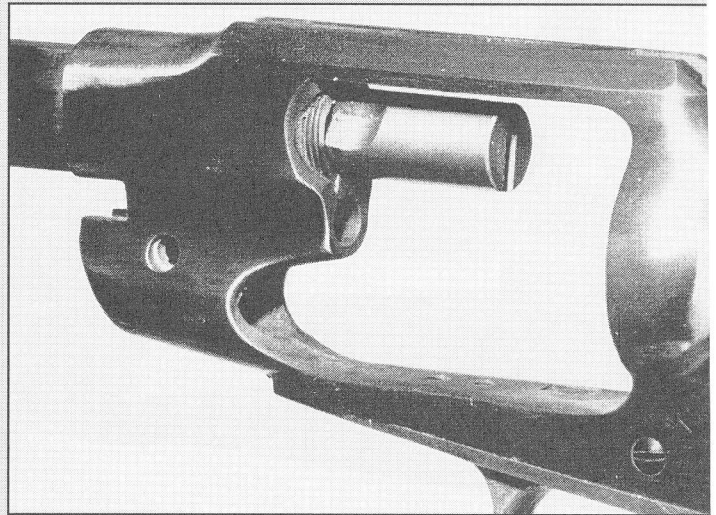


Chamfering a nipple with a file. The nipple is installed in the chuck of a drill press on slow speed.

the cylinder is revolved for the next shot, and the chamfered cone promotes this action.

Using a small sharp file, the hobbyist can put a slight bevel on the cone of each nipple. The major problem is securing the nipple in a vise to work on it without crushing the body of the nipple. A better way to chamfer nipples is with a drill press, inserting the nipple in the chuck. Then with the drill press on at low speed, a file can be held at the correct angle for a bevel on the nipple. Another way is with the nipple held in the chuck of a hand drill. But the hand drill must be secured in place so, when the file is held against the cone of the nipple, the cut will be consistent. If the drill moves during the operation, the angle will be altered.

Incidentally, the angled or chamfered nipple cone also improves cap installation, another positive aspect of tuning the revolver, because it makes shooting the gun a little easier.



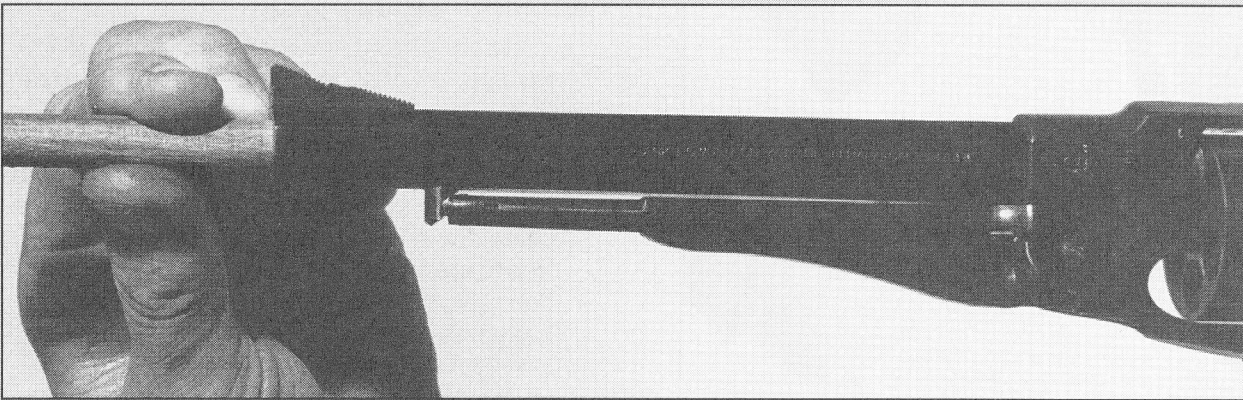
A special reamer cutting the forcing cone of this revolver.

Chamfering the Forcing Cone

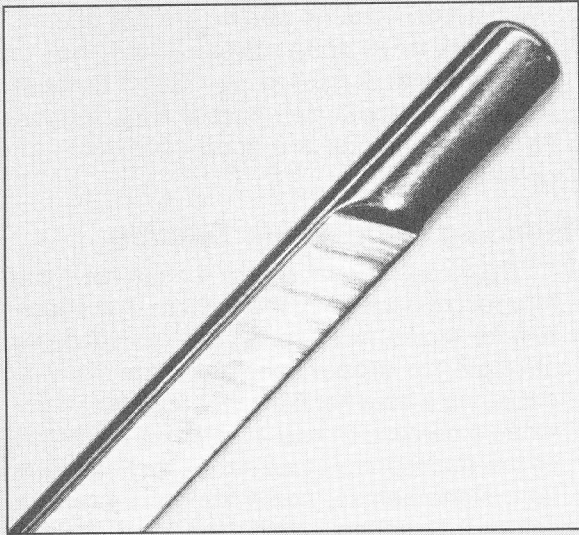
Check the forcing cone at the end of the barrel. If its angle is minimal, it can be chamfered with special reamers from Brownells to cut a proper forcing cone. If it is rough, it can be lapped with a special tool also available from Brownells. This is another of those steps the hobbyist needs to know about for his own body of knowledge, but the work is best accomplished by a professional. If the forcing cone looks rough or minimal, have your gunsmith improve this area, as it could make a difference in accuracy.

Checking Chamber Alignment

Now run a wooden dowel rod down the muzzle and into a chamber of the cylinder, checking alignment of bore to chamber. Check all chambers for alignment, not just one. If there is a mismatch, the dowel will hang up on the cylinder chamber. If it does,



Using a wooden dowel to check barrel/chamber alignment.



A cylinder pin after polishing with 600-grit wet/dry sandpaper.

the remedy is not one for the hobby gunsmith's shop and, in fact, may not be correctable at the local professional shop. In that case, the revolver should be returned to the factory. While the hobby gunsmith cannot fix this problem, it is important for him to be able to find the problem, and the simple wooden dowel, well-fitted to the bore, will do the trick.

Checking Cylinder Motion

The well-tuned revolver has clean, smooth cylinder motion. With the revolver in half-cock mode, turn the cylinder to check operation. If it binds, check the cylinder pin for straightness. A pin that is only slightly bent will impair the smooth function of the cylinder.

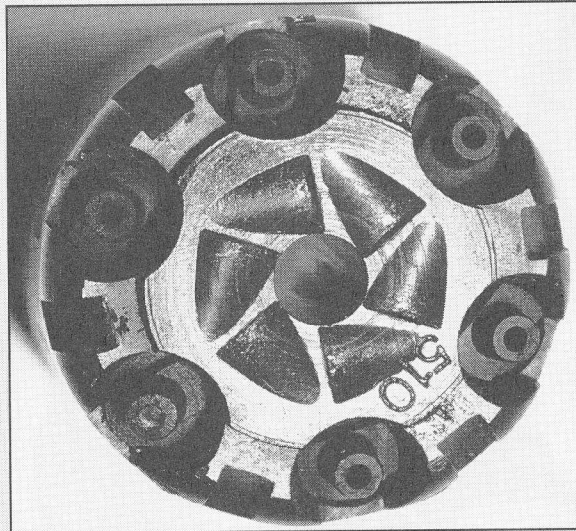
Also, using 600-grit wet/dry sandpaper, lightly hand polish the cylinder pin to improve fit. Simply brighten the surface and do not try to remove metal.

Removing Burrs on the Cylinder Star

Take the cylinder out of the revolver and check the star or back section for burrs. If burrs are found, remove them using a hard Arkansas stone. Do not remove any parent metal in the process—only the burr. You don't want to change the fit between the cylinder and the barrel or damage the star.

Chamfering Chamber Mouths

The mouth of each cylinder chamber can be carefully hand beveled using a chamfering tool. The idea is to only remove the sharp edge from the chamber mouth, reducing lead shaving of the projectile when it is being seated.



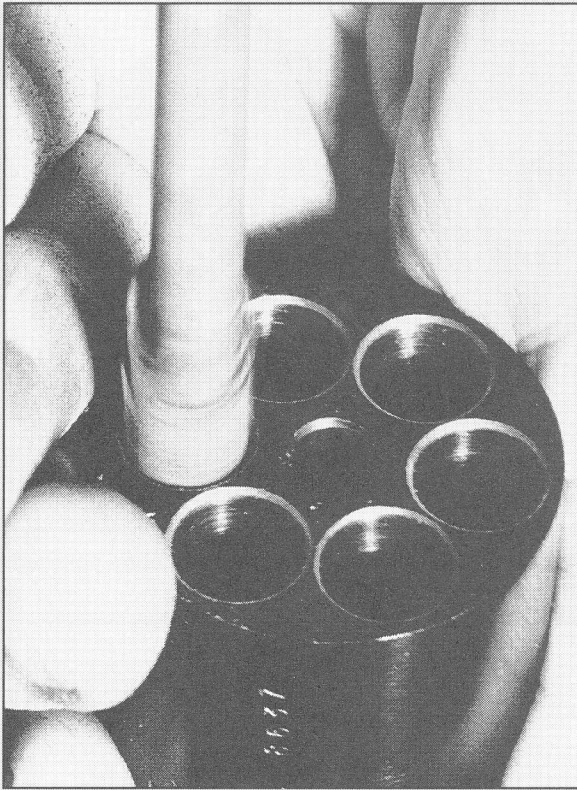
The star of the revolver cylinder with all burrs polished and removed.



The chambers are being smoothed with a chamfering tool.

Polishing Each Chamber

Using a slotted dowel and a power drill, each chamber can be polished. Attach the unslit end of the dowel in the chuck of the hand drill, and then place a piece of 400 wet/dry sandpaper through the slit in the dowel. Run the dowel into the chamber, then turn the drill on low speed and polish. Smooth chambers will enhance loading ease. Don't remove any metal—simply polish each hole.



Polishing each chamber with 400-grit wet/dry paper on dowel, using a power hand drill.

Polishing Working Parts

Completely disassemble the revolver, laying the parts in a small box where they will not be misplaced. Carefully polish each *working part* (mating surface) with a hard Arkansas stone, being certain to hold the part flat

against the stone so angles are not altered. The task is to polish these parts, not to remove metal or change part shape because functioning could be altered. Bolt, trigger, hand and hammer are good candidates for polishing.

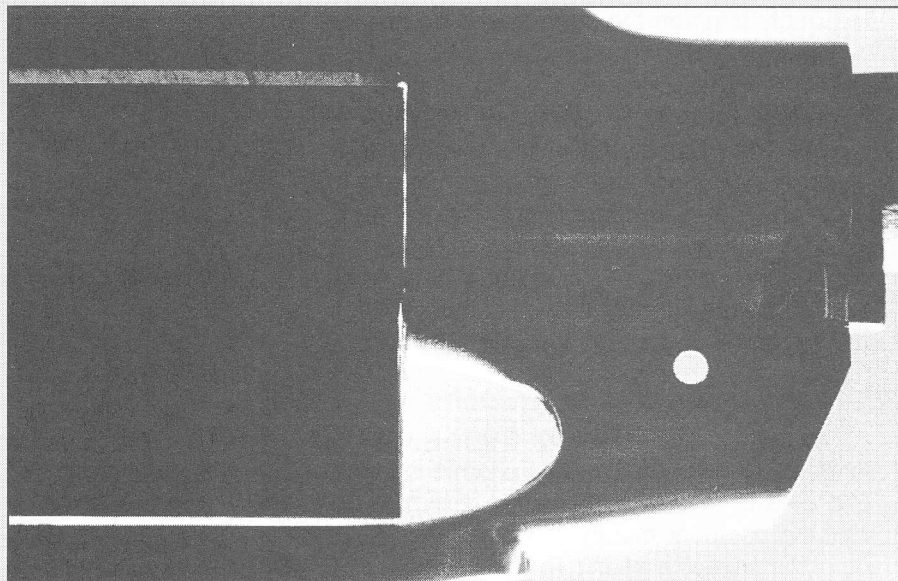
Reducing Mainspring Tension

This is an optional step and does not come fully recommended by the authors. It is important for the hammer spring to have adequate strength for proper function, especially in delivering a hammer blow that positively detonates a percussion cap. Lightening the action of the mainspring could result in weak ignition. Nonetheless, some shooters prefer a lighter mainspring action, and for those the following is offered: On guns that have a leaf mainspring (not a coil type), the spring can be filed down with a smooth mill file to make it thinner, which will lighten the action. Before attempting this maneuver, be certain to have an extra spring on hand to replace the original should it break, or should you wish to return to greater spring strength.

Checking for Cylinder Gap

Although the hobbyist cannot do anything about this problem, he should know how to check for it. Hold the revolver so light shines through the point between the cylinder and the barrel. If this gap looks excessive upon visual inspection, the revolver should be taken to a gunsmith to have him check it with a feeler gauge.

As noted in the text, there is nothing a hobbyist can do about an overt gap in between cylinder and barrel; however, it is important as a point of inspection. The gap on this particular cylinder is not excessive.



Improving Trigger Function

Tools

Oxygen-Acetylene Torch
Smooth Mill File
Soldering Iron

Supplies

Arkansas Stones, medium and hard
Hi Force 44 Solder
Quenching Oil
Sand with Metal Container
Short Lengths of Wire

Setting Up

The trigger should positively engage half-cock and full-cock notches. The notches are on the hammer, and the best way to repair non-functioning notches is to call the problem to the attention of a professional gunsmith. However, the advanced hobbyist can do the job by carefully filing the notches for positive engagement with small polishing stones. These stones must, obviously, fit well into the notches in order to make them square for full engagement.

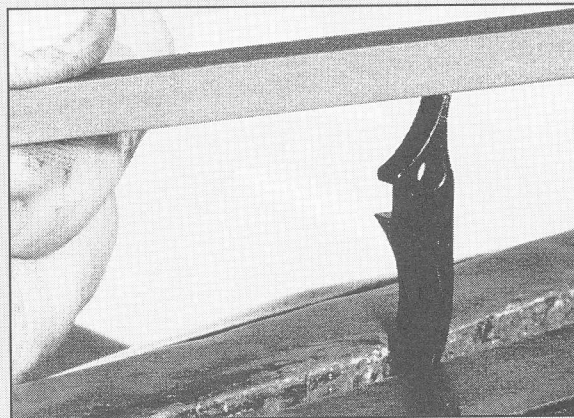
However, this step demands precision work, and the hobbyist must be willing to take responsibility for his work because a *botched trigger job can result in a dangerous situation.*

Polishing the Trigger

Carefully polish all engaging surfaces on the trigger using a hard Arkansas stone, removing all tooling marks. Maintain all angles, and do not remove metal or change the shape of a part. Especially clean and sharpen the surfaces of the trigger that engage the full-cock notch of the hammer.

Hardening the Trigger

Also, the trigger may be hardened, if its metal is soft. A soft trigger will wear quickly, which can later be unsafe. To check for hardness, run a file over an inconspicuous spot on the body of the trigger, rather than an engaging surface, which could alter the shape. If a file removes metal readily, the trigger is too soft and must be hardened. Case-hardening is the process used; however, if the trigger has a thin portion where it engages the hammer—such as the Colt Model



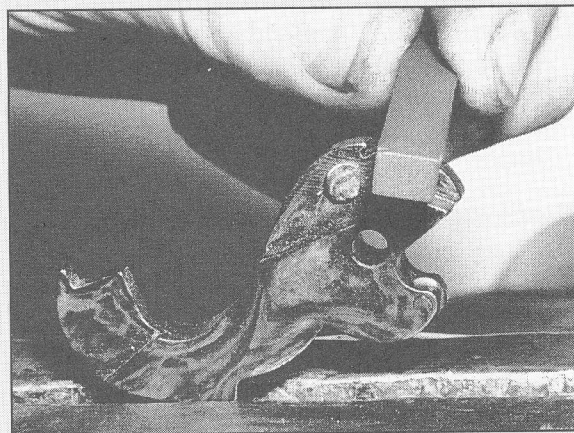
Stoning the trigger surface that engages half-cock and full-cock notches on the hammer.

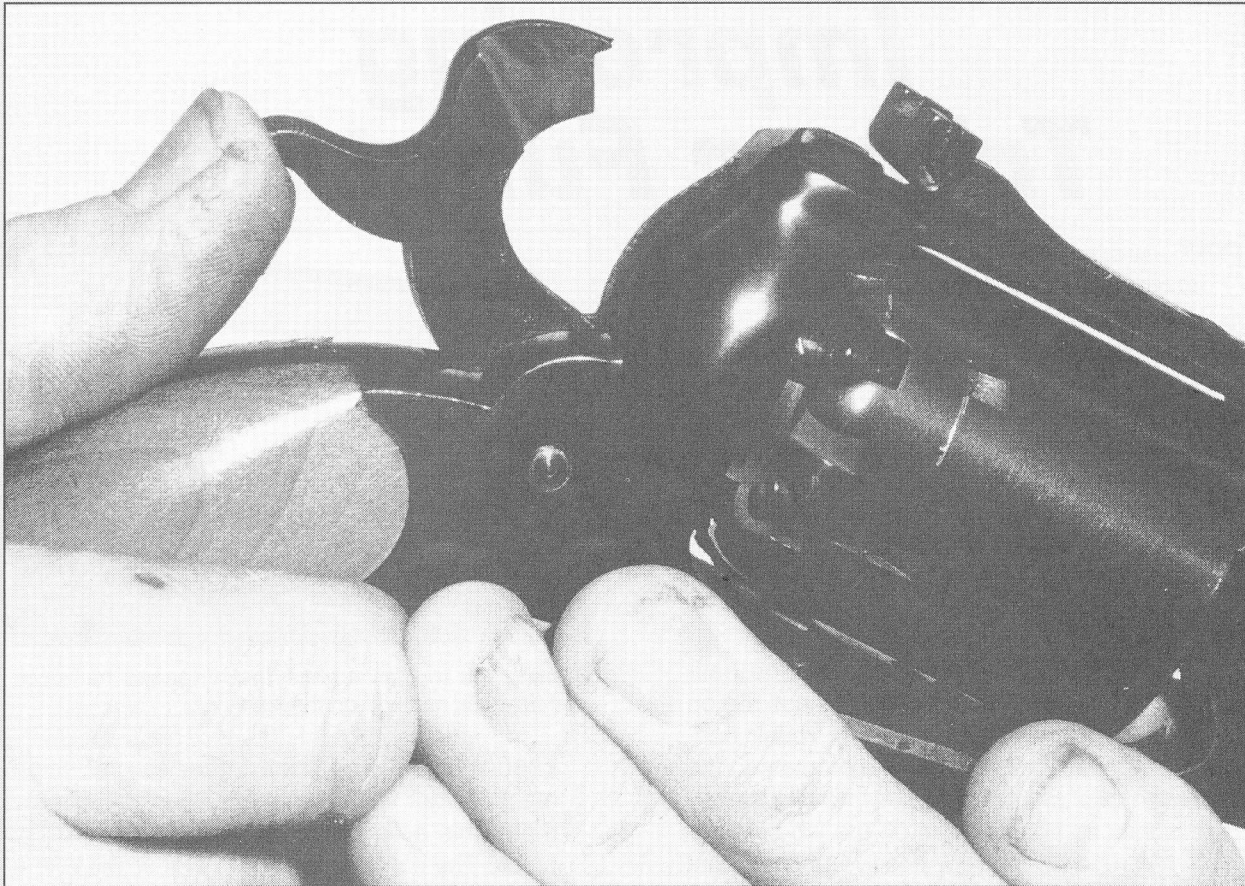
1860 revolver and some other single-action blackpowder revolvers—over-hardening may make this area brittle, at which point, it may break. The correctly hardened trigger will take a reasonable amount of pressure without breaking. Naturally, fast-draw use, which is discouraged with a blackpowder revolver in the first place, can put pressure on a hammer that will cause a trigger to break, even when it is properly hardened. Instructions for proper hardening techniques can be found in Chapter 5.

Polishing the Hammer

The full-cock notch on the hammer should be carefully polished so trigger matchup remains clean and breaks with no creep. For

Stoning the full-cock engagement on the hammer.





Checking the full-cock notch for positive engagement by applying pressure to the cocked hammer.

safety, engagement is never reduced to that point where the hammer is not held securely at full-cock. *Do not change the angle of the full-cock notch.* This is extremely important. The surfaces should be polished with a sharp-edged fine-cut stone, but should not be overworked. Polishing is once again the byword. Removal of metal here is incorrect.

Hardening the Hammer

The hammer may also be hardened, just like the trigger. If the surface of the hammer files easily, this test shows that it is too soft, and must be case-hardened. Instructions for hardening techniques can be found in Chapter 5.

Checking Positive Engagement

Next, check the trigger and hammer after reinstallation to ensure positive engagement of the full-cock notch. Make sure the gun cannot be forced off of full-cock by pushing forward on the cocked hammer. If it can, take the revolver to a gunsmith or send it back to

the factory for repairs. Also, the trigger should fully engage the half-cock notch and not come out when the trigger is pulled. When testing this condition, do not apply undue force to trigger, which could break something.

Testfiring

Finally, fire the revolver and make sure the hammer does not end up in half-cock after the gun goes off. If it does, this indicates the full-cock setting is too light. Or, in the case of the Colt 1860 and similar blackpowder revolvers, the trigger could be broken.

Tip: On the Ruger Old Army revolver, reduce the full-cock engagement by soft-soldering a piece of thin shim stock onto the bottom of the full-cock notch, effectively reducing the depth of that notch. If too much metal is removed from the top of the full-cock notch, the trigger will fall into the half-cock notch when the gun is fired. Take care and use a very low temperature solder, like Hi Force 44, so the temper of the hammer will not be affected by overheating.