

Tools and Procedures for Weapons Maintenance and Repair

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This presentation may be regarded as a sequel to the most excellent program delivered to the American Society of Arms Collectors by Ron Peterson at the meeting at Kansas City, October, 1988, and reported in the *ASAC Bulletin* No. 59.

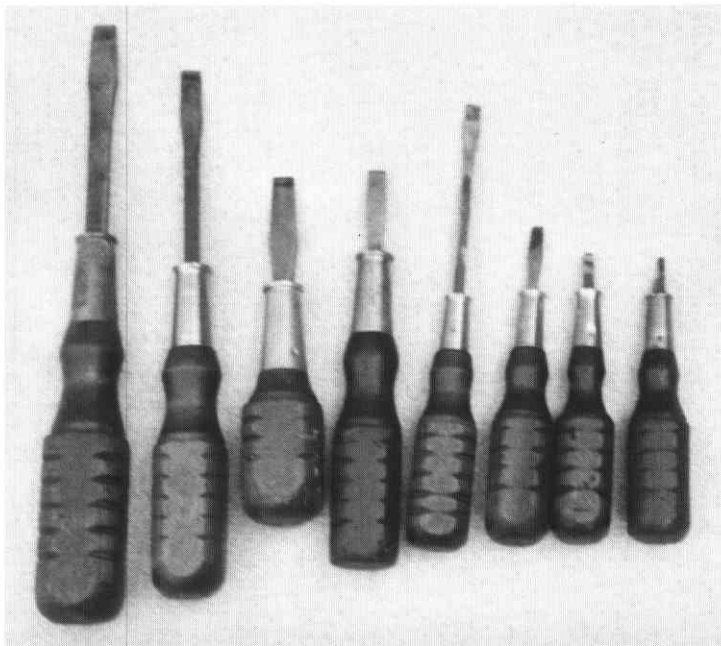
Let us first discuss appropriate tools necessary to proper maintenance of firearms in collections, and then detail the application of these.

SCREW DRIVERS

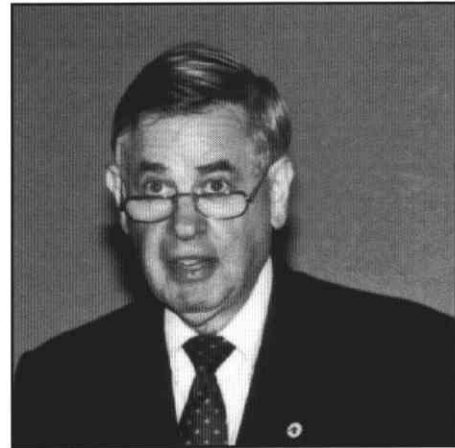
It has been said that a fool and his money are soon parted, but a fool and his screw driver are never parted. Which brings us to the proposition that the screw driver is probably the most abused and abusive instrument in the collectors' armamentarium.

The previous insistence upon careful fitting of the screw driver bit to the slot in the screw head is a point well taken. The home work shop is likely to have screw drivers which are better adapted to opening paint cans than to fine machine work.

Here is a set of screw drivers which are well adapted to gun work. Note the square handles. These serve to prevent the driver from rolling off the bench, but more important is a guide in grinding the bit.



It should be emphasized that there is nothing sacred about the bit of the screw driver. It should be fitted to the screw slot with exactitude by grinding if necessary.



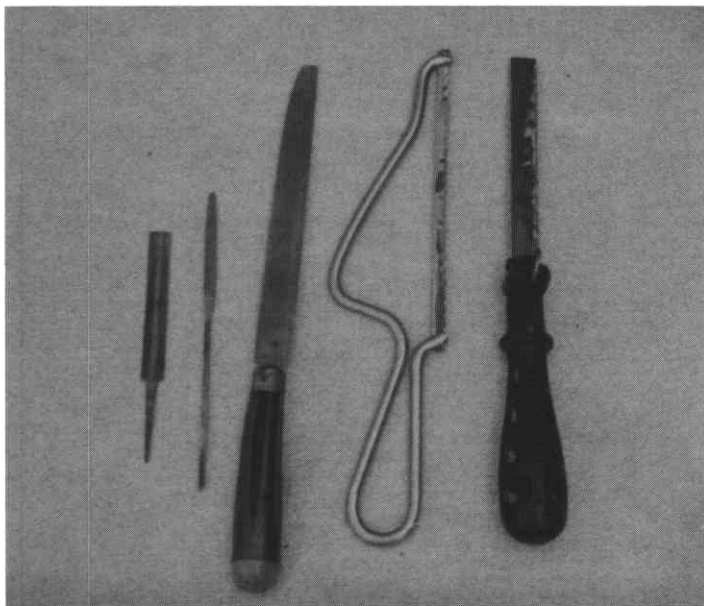
The appropriate flat surface of the handle is held against the tool rest of the bench grinder to establish the first surface, and then rotated 180 degrees to establish the other surface. In this way the screw driver bit will be the same thickness across the working edge. The hollow ground shape is adapted to most gun screws which have screw slots with parallel sides. The square shank of the screw driver offers a purchase for a crescent wrench to apply greater torque to stubborn screws.

FILES

Files are of major importance, but are often misused. With the exception of some special purpose files, new files should not be used on hard materials such as steel. The cutting edges of new file teeth are quite thin and fragile. New files should be used only to cut relatively soft materials such as copper, brass, german silver, pewter, and the like. Not only will new files cut these soft materials rapidly, but also the fragile edges of the sharp teeth will be modified to a more durable form. These modified edges can then be used with impunity to cut steel and iron. The cutting stroke of the file should be a firm, well-controlled push. On the return stroke the file should be held just out of contact with the filed surface. Dragging the file over the work on the return stroke dulls file teeth.



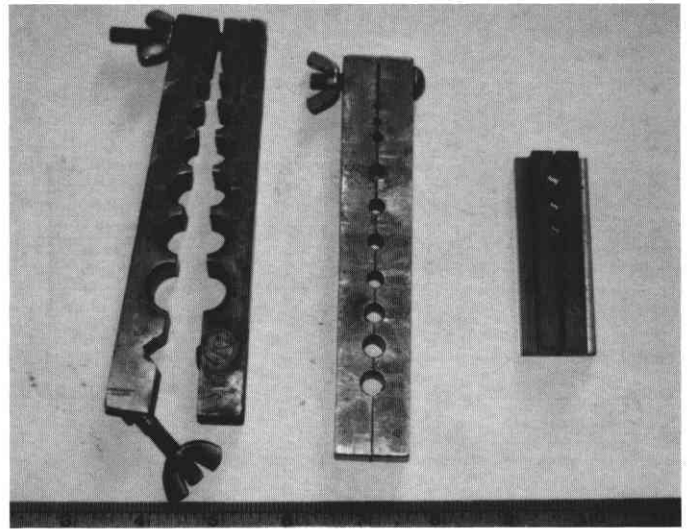
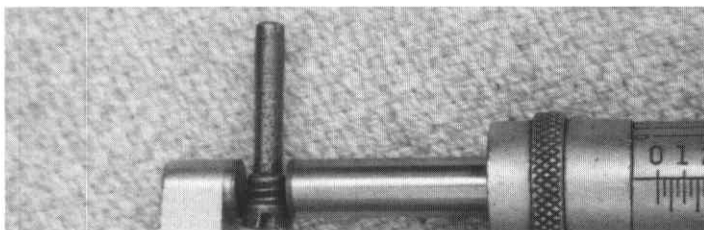
A variety of files for weapons repair.



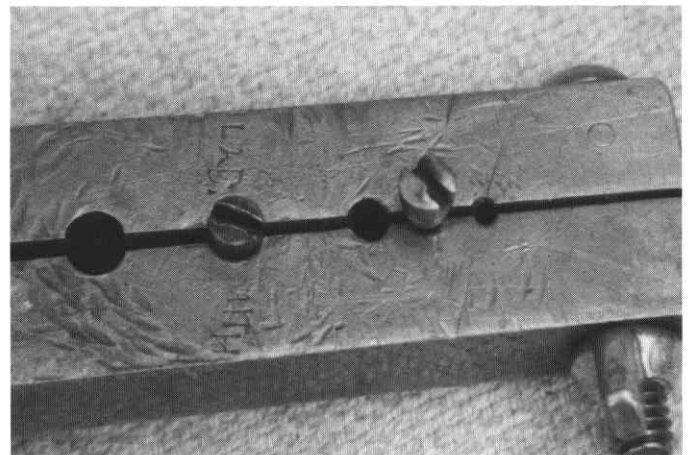
Damaged screw heads may sometimes be peened to approximate shape, but the screw slots require some degree of shaping. This group of cutters are used to true screw slots. On the left is a delicate slotting file, used principally in set trigger mechanisms to cut a slot as narrow as .015". Next is a knife edge needle file, and then a still larger slotting file. The mounted saw blade has been modified by grinding the side to remove the set, thus producing a narrow curf. Finally there is a hack saw blade with the set ground out to cut a still wider slot.

PEENING INSTRUCTIONS

Screw heads which have been damaged by an ill-fitting screw driver may be peened to improve appearances. If the screw head is to be recessed, diameter is a critical dimension. A micrometer measurement is made before working the head.



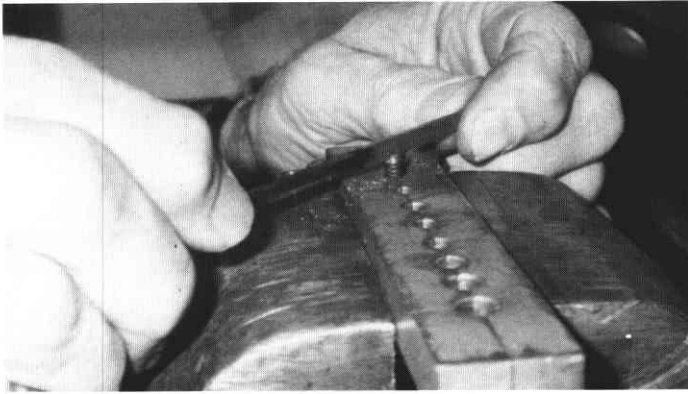
Here are three different sizes of riveting stakes or pin stocks. Note the variation in the sizes of the holes. These will hold round stock without scarring, and tubular parts without flattening, such as the ejectors on cartridge swing-out cylinder revolvers.



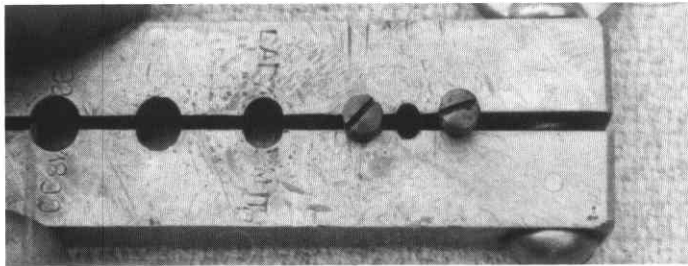
Two badly defaced screws in the pin stock to support the head.



The mushroomed screw head is peened to establish proper diameter, alternating with hammer blows to close the widened screw slot. As the diameter is reduced and the screw slot is closed, the displaced metal is brought to contour as nearly like the original shape as possible. Since no new metal is being added, filing to shape should be minimal.



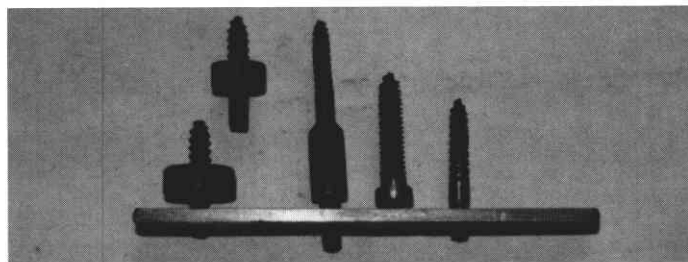
The screw slot is filed to proper width as nearly as possible to the original. When facilities permit, the head can be lathe-turned to dimension. Finally the restored head is polished and blued, if appropriate.



These are the same two screws after regaining proper form by peening and filing. (Honestly, I didn't switch!)
 Special note: peening blows should be very light, more than expected. With patience and much care, great results will be the reward!

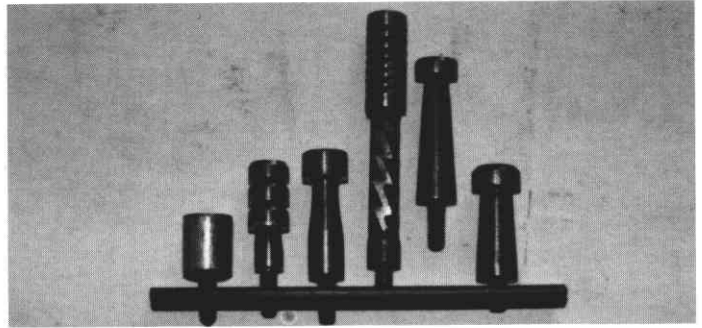
UNLOADING THE MUZZLE LOADING BARREL

It is not uncommon to find a flint lock or percussion rifle or pistol still retaining a load, a potentially dangerous situation. The load may be detected by running a cleaning rod down the barrel and marking it at the muzzle. The rod is then removed and laid along side the barrel. Allowance is made for the length of the breech plug, and if the rod tip still stands a distance from the face of the plug, it must be assumed that a load is present.



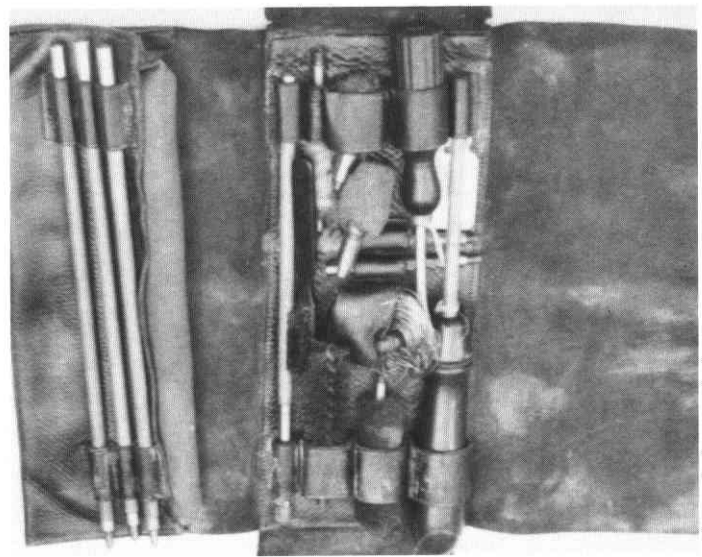
Removal of the load begins with the ball puller, one end of which is like a wood screw thread, and the other end threaded for the loading rod. In order to keep the screw centered in the bore, a thick brass washer is soldered between these two threaded sections. Different size brass washers are used with a range of bore sizes.

The cleaning rod should have a handle which allows it to rotate to clean the bore, but the rod should be locked rigidly to the cross handle to allow the ball puller to be forcibly screwed into the lead ball. This is accomplished by drilling a hole through the handle and rod. The insertion of wire through the hole locks the rod to the handle, thus enabling a firm downward pressure on the rod to turn the screw into the ball.



Here is a group of cleaning jags of different calibers and designs. The steel cylinder on the left is an adapter with a stem threaded 8 x 32 for the cleaning rod, and the cylinder threaded 5/16" x 24 to adapt the rod for large diameter shot gun brushes and jags.

CLEANING



A tool roll can carry a variety of cleaning devices. This roll is opened to show a jointed cleaning rod which is made with a steel core covered with wood to avoid bore wear. Included in the contents of this roll are bore mops, cleaning jags, brushes, and screw drivers.

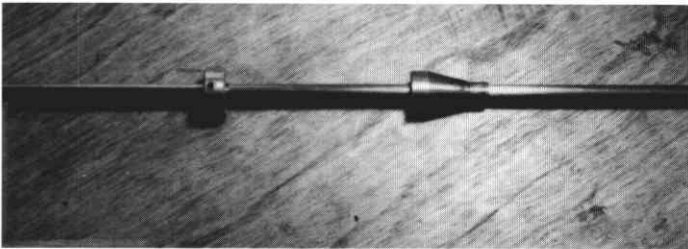


One of the chief detriments to the popularity of muzzle loading black powder shooting is the chore of cleaning after use. The procedure described here is thorough and quick. This rifle fitted with a bolster has the lock and the percussion nipple removed. Beside the rifle is a plastic tube fitted with a metal tube threaded 1/4 x 28 to screw into the nipple hole.



The fitting is screwed firmly into the nipple well so that the end of the plastic tubing is sealed against the surface of the nipple seat. The free end of the tubing is immersed in a can of hot water. A cleaning patch is run down the bore, and as it is withdrawn, water is drawn up into the bore. The next down stroke expels dirty water, and the process is repeated by pumping the cleaning rod up and down until the bore is clean. As a precaution, a can of clean water and a fresh cleaning patch are used to pump out the bore which should be clean by this time. Now the tube is removed and the bore is dried with cleaning patches and thoroughly oiled to prevent rust. This same procedure can also be used with the drum type barrel, but the water proof seal at the breech is not so easily obtained against the round surface of the drum.

PRECAUTIONS IN MUZZLE LOADING



One of the greatest dangers in black powder muzzle loading shooting is failure to seat the bullet firmly on the powder charge. If the bullet is not fully seated it will act like an obstruction and cause a swell in the bore, and may even explode the barrel with serious consequences. In order to insure adequate bullet seating it is necessary to establish the length of the loading rod when the charge and ball are in the barrel. This thick brass washer slides easily on the rod until secured with the Allen screw. Upon the initial loading the washer is secured at the muzzle with the screw. On subsequent loading the rod is pressed home until the washer comes into contact with the muzzle of the barrel, thus insuring full seating.

REMOVAL OF FROZEN NIPPLES

Penetrating oil will assist in the removal of frozen screws and nipples. Sufficient time should be allowed for the penetration to take place, preferably over night. Heat greatly enhances the action of the penetrating oil. Of course heat should not be applied to case-hardened parts which have the delicate colors protected by a coat of lacquer, and should be used with caution on blued surfaces. Heat can be safely applied in the kitchen oven at about 250 degrees.

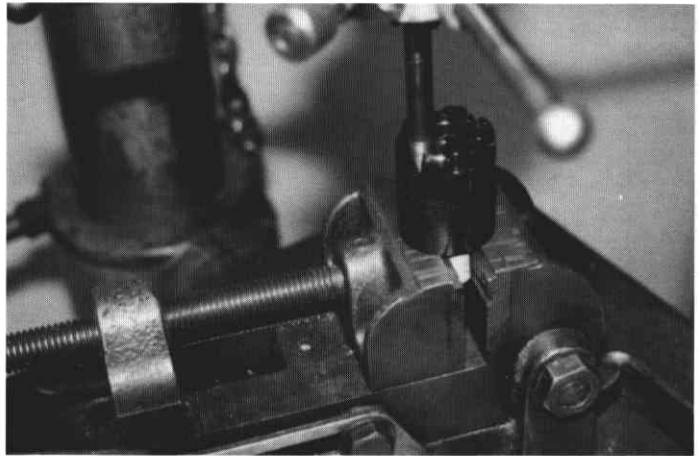
One of the most vexing problems encountered by the collector

of percussion revolvers is the safe removal of frozen nipples. There is a risk of damage if the wrench is allowed to back away from the nipple well while force is being applied. This will likely deface the nipple shoulder.

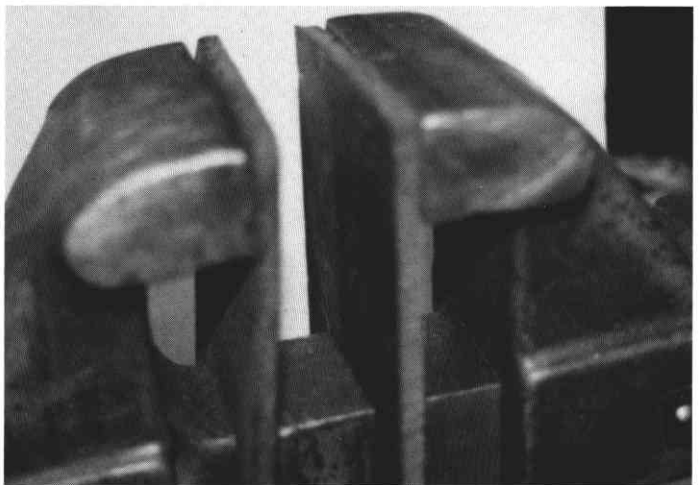
Nipple removal can be accomplished on the drill press. ON NO ACCOUNT SHOULD THE FRAGILE ROLLED ENGRAVING OF THE CYLINDER BE EXPOSED TO THE VISE JAWS, WHETHER PADDED OR NOT.



Segments of wooden dowels are placed in opposite chamber cavities. The dowels are transferred to the vise and secured to establish proper spacing.

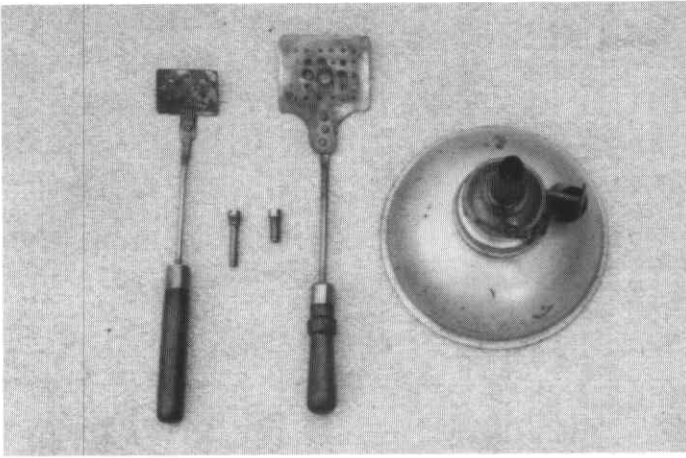


The nipple wrench is secured in the drill press chuck, and adjusted to allow the wrench to be fully seated. The vise is now locked in place. The drill press lever is locked in place, and torque is applied by the cross arm rods. After the nipple is broken free and the threads begin to unscrew, the drill press lever is raised just sufficiently to allow freedom to turn.



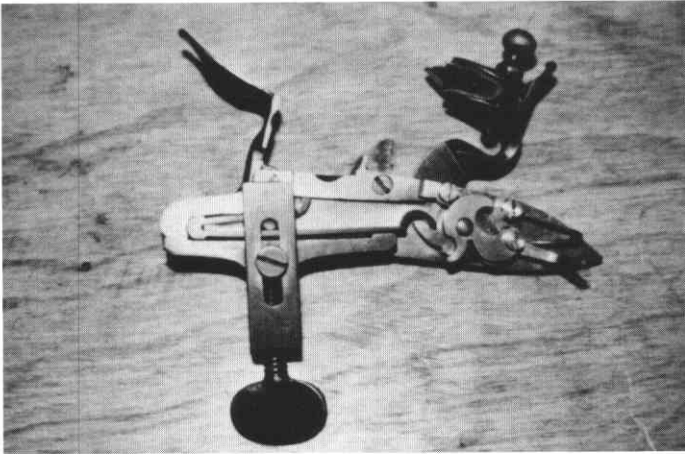
Vise jaws may be padded to protect vulnerable surfaces. The greatest degree of protection is afforded by Masonite liners, as shown here.

Offering less protection, but a firmer hold, are aluminum pads, and for a firmer hold, there are brass protectors.



A TECHNIQUE FOR HEAT BLUING

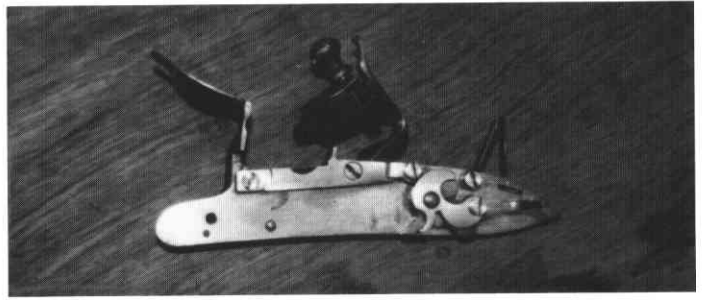
Screws which have been repaired may need their blue finish restored. This can be done with heat. Pictured are two bluing pans made of sheet brass. Holes of different sizes are for screws of different diameters. Screw shanks are inserted in the appropriate holes in the pan. Heat is applied by an alcohol lamp which burns cleanly without soot. As the pan becomes hot, the polished screw head begins to undergo a series of color changes from light straw color to light blue, and at the optimum color development, a beautiful sapphire blue. CAUTION: The color changes begin to take place rapidly. When the optimum blue is achieved, the screw must be immediately quenched in oil. I like to use paraffin oil for this purpose. If the color change is carried beyond optimum, the screw must be repolished and the heat reapplied.



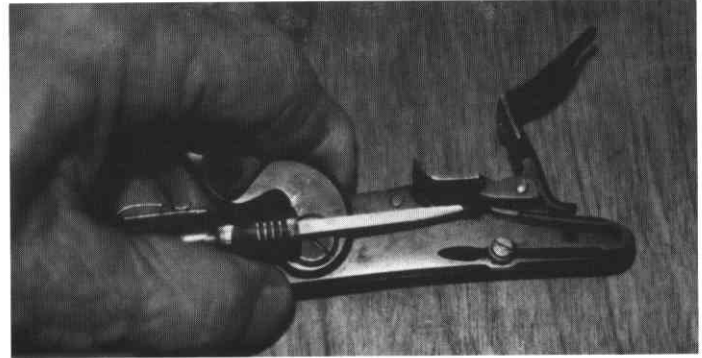
DISASSEMBLING A GUN LOCK

It is often desirable to disassemble a gun lock for cleaning or repair. If done improperly, scratches, abrasions, or even broken parts may result. The following steps are recommended. CAUTION: Care should be taken to avoid placing transverse spring pressure against screws which are being removed!

The cock is placed on full cock which compresses the mainspring. The mainspring vise is clamped on the compressed mainspring and the sear is tripped to relieve all tension on the lock plate. The mainspring can now be lifted away. If a mainspring vise is not available, a small "C" clamp can be substituted.



The sear spring screw is loosened and the spring is disengaged from its slot in the lock plate. The sear spring is removed.



To remove the frizzen, a small screw driver is used to compress the frizzen spring, using the under side of the pan as a fulcrum. This pressure is maintained while the frizzen screw is removed and the frizzen lifted away. The frizzen spring can now be removed.

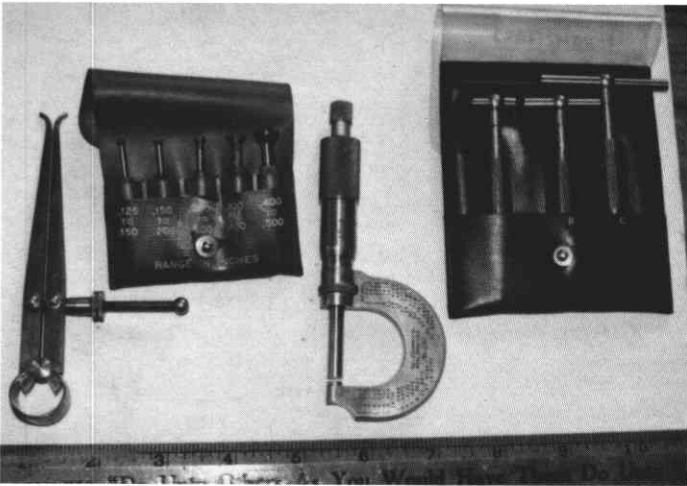


The cock screw is removed and now the cock must be removed from the tumbler square. CAUTION: The cock should never be pried off the plate with a knife blade, screw driver, or wedge. Not only will the plate be scarred, but as the cock is lifted away, the tumbler square is likely to come with it. Instead, the plate should be supported in a vise with the tumbler free of the vise jaws. A pin punch is placed in the cock screw hole in the tumbler and tapped with a hammer. In this way the cock is easily and safely separated from the tumbler. CAUTION: Care should be taken to avoid the loss of the fly, if there is one.

EXAMINING THE BORE

Examination of the bore includes determination of the caliber, or gauge, and an appraisal of the condition of the rifling. The latter is easily accomplished in breech loading arms, but requires other means in muzzle loaders. A taper gauge gives an approximate reading of the bore size at the muzzle.

Bore mirrors are furnished in a set of five, for five different calibers. The checkered end is first dropped down the muzzle, and a bore light is used for illumination. Light is reflected off the concave surface of the mirror to provide good visibility to show bore condition. Hole gauges and a micrometer are used to determine bore size.

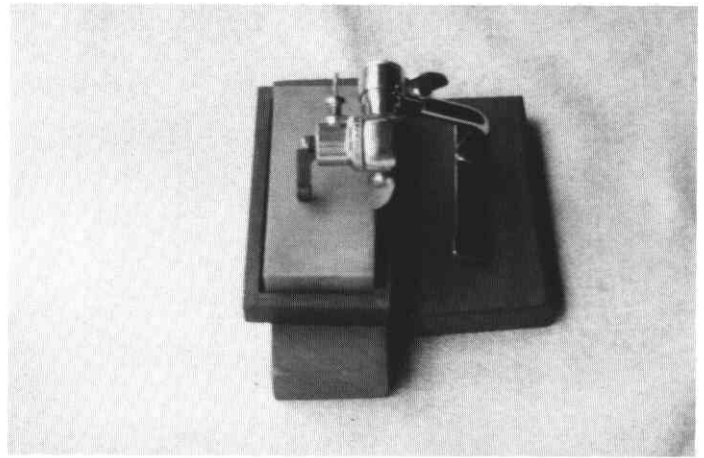


At the left is a set of small hole gauges in graduated sizes from .125" to .500". At the right are hole gauges for larger bores. Micrometers are used to make accurate readings taken from these gauges.

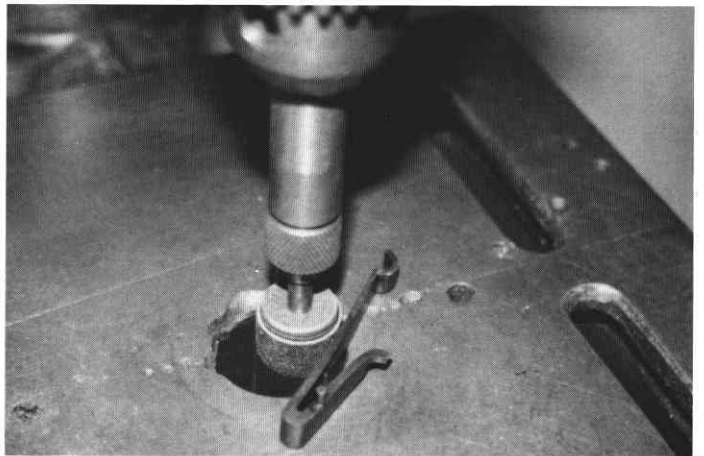


Smooth, dependable lock work requires the proper angle and polished engagement of the sear and tumbler notches. Hand-held sears are difficult to control. A very precise sear engagement can be accomplished with a surveyor.

Here the sear is set up for stoning the engagement surface with an India stone. Note that two stones are stacked one over the other.



After the coarser India stone has established the surface, the position of the stones is reversed to bring the fine white Arkansas stone on top of the India Stone. This plan avoids the necessity of making new adjustments in the surveyor.



Here a small arbor band is used to polish the curved working surface of a mainspring which is held flat on the drill press table, thus preserving a true perpendicular surface.



My shop assistant.

Fellow members and guests, I hope you have gained some ideas from this presentation that will enhance your pleasure in collecting, and enjoyed it as much as I have had in preparing it for you.

Acknowledgements

John Bivens for his guidance in lock assembly and adjustment.
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