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PRECISION ARMS WORKSHOP

AND THE AMERICAN GUNSMITH ARCHIVE

A TECHNICAL JOURNAL OF CRAFT, REPAIR & RESTORATION

08

ARCHIVE ISSUE NUMBER

INSIDE THE ARCHIVE

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\$27,846,304,300.00 • DISASSEMBLY/REASSEMBLY OF THE EMP 9C1 PISTOL • TIMNEY TRIGGER INSTALLATION ON TH...

ORIGINAL METHODS. MODERN ACCESS.

ARCHIVE EDITION 080

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FROM THE ARCHIVE

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BY AMERICAN GUNSMITH EDITORS AUGUST 2010

ORIGINAL PP. 2

That is the total influence the Firearms and Ammunition Industry had within the United States in 2009 according to a report commissioned by the National Shooting Sports Foundation detailing the significant, positive economic impact we have on our nation. In the midst of a recession, stock market crash and housing crisis our modest little industry actually prospered.

In fact, it did better than that as the report found the shooting industry went up significantly from the 2008 estimates of \$19.2 billion, an increase of eight BILLION dollars! The economic growth America's firearms and ammunition industry experienced last year was driven by an unprecedented number of Americans choosing to exercise their fundamental right to keep and bear arms and purchase a firearm and ammunition.

Said NSSF President Steve Sanetti, "During difficult economic times and high unemployment rates nationally, our industry actually grew and created 16,800 new, well-paying jobs. Our industry is proud to be one of the bright spots in this economy." I think we can account for this due to the fact that shooting sports aren't terribly expensive and they give a unique experience. Firearm use is an active, participatory activity. And let's face it, guns are just a whole bunch of fun.

Hollywood wouldn't continue making lousy action movies if people truly hated them. Also cited in the economic impact report were the significant taxes paid by

industry member companies to federal and state governments along with the Pittman-Robertson excise tax the industry pays on the products it sells. This tax is the major source of wildlife conservation funding in America. In 2009, over \$2.7 billion dollars went to fund these programs.

This translates to sportsmen nationwide generating \$7.5 million dollars every day for wildlife conservation efforts alone, just by doing what we love. \$7.5 million per day! Hmmm, I wonder how much PETA and other so-called animal rights groups are kicking in? Despite the surge in new owners, America is seeing a continued decline in accidental firearm-related deaths, a more than sixty percent decrease in the last twenty years, along with a continued drop in crime rates nationally.

I'm sure this fact won't get in the way of firearm abolitionists but it is reassuring for most sane people. This only serves to yet again reinforce truths we've known all along: 79,999,000 American gun owners harmed no one yesterday. Of real importance to us is what to do with them. Hunter Education has proven that even simple training understandable by middle school kids is sufficient to prevent most mishaps, a firearm in the hands of a completely untrained person is a potential nuisance or worse.

While it is encouraging that the industry is enjoying a surge in sales, this will only last as long as we are able to maintain that enthusiasm and interest.

PISTOLS

Disassembly/Reassembly of The EMP 9C1 Pistol

Importer EMF turns up a brand new, American-made polymer 9mm handgun that carries a strong message.

BY CHICK BLOOD AUGUST 2010

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Back in the day, California was acting like Gun Valley West and giving long established East Coast manufacturers quite a run for consumers' firearms dollars. Politicians and activists were not being able to stand such financial success and soon the Golden State's thriving gun business was systematically legislated into non-existence. These assorted knee jerks of applied economic ignorance were accompanied by a sizable number workers cast to unemployment lines and a disastrous amount of lost revenue.

In addition, a Twentieth Century exodus to Nevada, Arizona, New Mexico, Oregon, Wyoming and elsewhere was undertaken by Lotus Land residents and businesses deciding to dwell no further in what they felt was being irreversibly transformed from a paradise into a Peoples' Republic. Among those who chose to stay, stand and fight was James V. Pontillo II, a firm believer that

exceptionalism is the quality Americans possess and embrace which defines and differentiates our culture from all others.

As deeply, he believed that government has no right dictating peoples' individuality and aspirations but is exclusively responsible for protecting those freedoms as the founding fathers have made eloquently clear. It seemed only natural, then, for James Pontillo II to apply his life-long experience in plastics, their vacuum forming, injection molding and in tool building to the design and manufacture of a handgun.

His decision wasn't primarily impacted by the California hostility to such things nor to spite the political forces responsible for creating that environment. To Pontillo, it just seemed like "the American thing to do." He began his work on the 9C1 in 2001. Between then and now, changes were made as California laws changed. His gun was not to be counted among those who carry the infamous words: "Not for sale in California..." or any other state.

As finally produced by FMK Firearms, founded by Pontillo for its manufacture, the 9C1 includes a Glock-inspired safety trigger, a trigger guard designed to prevent accidental depression of the trigger and discharge, a loaded chamber indicator, a striker indicator warning the operator that discharge is imminent, a magazine-out trigger disconnect feature and a firing pin block.

The pistol is a striker-fired DAO chambered for the 9x19mm, is 6.85-inches in length, 5.09-inches in height, 1.14-inches wide, weighs 23.45 ounces empty and wears a four-inch, six-groove left hand twist barrel. It is guaranteed for two years to be free of defects in materials or workmanship. Any 9C1 returned to the factory that fails to meet these requirements and hasn't been misused or modified in violation of the warranty will be repaired or replaced at no cost to the owner.

If replaced, FMK will keep the defective weapon and return ship anew one.

DISASSEMBLY/REASSEMBLY OF THE EMP 9C1 PISTOL CONTINUED

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Field Stripping As always, remove the magazine, check for an empty chamber and put on some eye protection. Maintain a hold on the grip frame with one hand, wrap your free fingers over the slide and slightly retract it. Swivel the barrel release lever downward and the slide will nudge forward under recoil spring pressure. Grasp the slide and remove it to the front and off the frame. Press forward on the recoil spring assembly and lift it free. Do the same with the barrel. There are two holes in the end cap.

Insert a 1/16-inch diameter punch in the upper, smaller hole, depress the striker and start the end cap moving downward. You want to move it far enough initially to capture the striker. Place a finger over the large

hole and continue moving down the end cap. You'll be relying on the finger to prevent the striker from exiting the slide once the cap is out of its way and until you choose to withdraw it.

This preps a Also pictured, the slide hold and spring (B) and an example of a parallel drift punch (C) recommended for removal of frame pins. 9C1 for general cleaning. In that process, brush out and lightly lubricate the striker tunnel within the slide. Slide Disassembly The extractor (9) is under some tension from its spring (8) and both are retained by a roll pin (10).

This pin is drifted toward the top of the slide and is very small (0.085 inches.) You may have to turn down a 0.093-inch punch to ac-

commodate the size. One of my running suggestions regard The trigger pin is located above the guard opening (A) and the housing pin (B) toward the rear of the grip frame. B A Cing roll pins is about to be restated. Whenever possible, do not drift roll pins all the way out, just far enough to free the part(s) they retain. Why not drift roll pins completely out?

Leaving them partially installed makes re-assembly easier and eliminates the danger of damaging a pin in efforts to get it started back into its hole. Admittedly, a set of Brownells Roll Pin Starters go along way in precluding this re-entry damage, but I tend to be somewhat chicken

DISASSEMBLY/REASSEMBLY OF THE EMP 9C1 PISTOL CONTINUED

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The trigger/trigger bar assembly has been removed for this photo. when dealing with roll pins, especially really skinny ones. In the case of the 9C1, the roll pins we're worried about are the extractor and spring. When those two parts have been removed, the firing pin block (25) and block spring (24) can be picked from the slide if they haven't come out on their own. The loaded chamber indicator assembly, (5 & 6), nests in a slot under the extractor.

Go at these indicator parts from the rear of the slide to move them forward. Final removal may call for a little tilting of the as-

sembly. Frame Disassembly Advice comes first: The frame of the 9C1 is polymer with steel inserts providing bearing surfaces between it and the all-steel slide. Inserting a tapered drift punch could enlarge an entry hole on either side of the frame. Ergo, use parallel-sided drift punches exclusively when moving pins out of the frame.

This movement begins right now with the trigger pin (17) and housing pin (18), both from left to right. The barrel guide (26) is a tight fit. A small, bladed screwdriver may be needed to The 9C1 makes it clear if it is loaded and ready to fire with large, red indi-

cators. Aget it started. Any prying, however, must be accomplished from the magazine well, or rear, side of the guide as it is too easy to cause damage to the front of the guide due to its design.

The rear housing (21) and the entire trigger/trigger bar assembly (27) lifts out as a unit. The trigger spring (32) hooks on to the housing (21), holds everything together and won't fly

away. However, the trigger spring pin (31) doesn't exist on newer production guns. What might happen when you remove the trigger/trigger bar assembly is the slide hold (30) and its spring (29) will come with it.

Hopefully they won't, but the mere possibility should encourage you to take a closer look under magnification at how those parts fit together and how the spring is seated in the frame before pulling out part number twenty seven. 1 Frame 2 Frame Back 3 Magazine Assembly 4 Striker Assembly 5 Chamber Loaded Indicator 6 Chamber Loaded Indicator Spring 7 Rear Sight 8 Extractor Spring It's possible to further disassemble the trigger/trigger bar assembly but I advise against it.

All its components are key actors in the magazine-out safety (MOS) feature. The housing has a cam on which the trigger bar rides and by which it is guided.

When the magazine is removed from the pistol this cam rotates forward to move the trigger bar abutment and misalign it, thereby eliminating any contact with the 9 Extractor 10 Extractor Pin 11 Front Sight 12 Front Sight Screw 13 Slide 14 Barrel 15 Recoil Spring Assembly 16 Barrel Release 17 Trigger Pin 18 Rear Housing Pin 19 Magazine Release Spring 20 Magazine Release 21 Rear Housing/MOS Assembly 22 Ejector 23 Slide End Cap 24 Block Spring striker.

As a result, when the trigger is pulled with the magazine out the pistol will not fire though there still might be an overlooked round still chambered. As can be determined from the accompanying diagrams this misalignment enables the firing pin block to prevent the striker from moving forward to ignite a cartridge primer.

Of course, when a loaded magazine is reinserted all bets on these built-in safeties are FMK Firearms 9C1 (Specifications subject to change without notice) 25 Block 26 Barrel Guide 27 Trigger Bar Assembly 28 Barrel Release Spring 29 Slide Hold Spring 30 Slide Hold 31 Trigger Spring Pin 32 Trigger Spring

DISASSEMBLY/REASSEMBLY OF THE EMP 9C1 PISTOL CONTINUED

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Above left and off, but the trigger safety remains fully functional. As you can see from the schematic, the magazine release spring (19) appears to be straight. Actually, it has a ninety degree bend at its base that snugs tightly into a horizontal frame cut. I suggest you leave it there. The main vertical element of the spring seats in a channel molded into the frame. The arrow in the schematic identifying the magazine release (20) points directly to a window cut-out in the bottom of the release.

Very carefully insert the blade of the small screwdriver between the left edge of the spring and its channel wall. Hold your thumb against the right side of the magazine release. "Encourage" the spring to move toward your thumb until you can see the spring end visible in the release window. Now further "encourage" the spring to come through the window and push the release out of the frame from the left.

I keep stressing "encourage" because I don't want you to be obliged to purchase anew spring, anew release, or both. You must take

the same precaution when reinstalling these parts. I'll cover that aspect in the next section on reassembly tips. Little is left in the frame. It includes the barrel release spring (28) and the release (16). Depress the spring and slide out the release in either direction. The frame back (2) has two tabs at its top. These have to be squeezed together before the back is slid down and off.

Reassembly Tips The barrel release spring is introduced from the top. Insert the release until it contacts the spring then press the spring down and complete installation of the release. As you insert the release from right to left, move the spring to a center position in the release window. When centered, release pressure on the spring and push the release to flush with frame left. The trigger/trigger bar/housing assembly is reinstalled as a unit and the barrel guide pressed back in to retain it in place.

After the guide is seated, reinstall the rear housing and trigger pins in that order. The trigger pin has one rounded and one flat end and is inserted rounded end first from right

to left. Be certain the slide hold and its spring are aligned and seated properly in the frame to accept the trigger pin. Reinstall the loaded chamber indicator assembly in its extractor slot before the reassembling the extractor and its spring to the slide. Commentary Much earlier, I mentioned the 9C1 carried a strong message.

It wasn't stated in reference to its caliber or that it has been designed for personal defense. The pistol actually wears that message on its slide. They are words upon which the American people have based their great successes and greater freedom for over 200 years, words sworn to defend and uphold by all elected to government but seemingly put aside by actions taken soon after occupying their seats. They are the Bill of Rights. All ten of them.

Because one man had the guts to have them boldly appear on a firearm conceived and made in defense of all who still believe in and will stand to uphold those rights I humbly cast my vote for the 9C1 as Handgun of The Year, 2010. AG

MACHINING

Timney Trigger Installation on the Savage M112

A Model 631 Timney allows a safe pull weight from 1 1/4 - 4 pounds along with adjustment for sear engagement (creep) and over travel.

BY NORMAN E. JOHNSON AUGUST 2010

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Trigger replacement on the Savage 110 series is basically uncomplicated requiring no specialized tools and is not intended for replacement on rifles equipped with the new Savage Accu Trigger. The Timney aftermarket trigger is CNC machined from solid steel and case hardened to ensure a lifetime of trouble-free operation. This unit is fully adjustable and packaged with complete instructions.

To replace the trigger, remove the action from the stock and place the barreled action in a padded vise with trigger facing toward you. The wire-like trigger adjustment spring positioned at the side of the trigger is easily removed with the fingers and placed to the side. This leaves the trigger free to move on the hinge pin. At this time the trigger can be removed by releasing the retaining washer from the trigger hinge pin and removing the pin.

I usually place these very small parts on a piece of adhesive tape to prevent loss. As received, the new Timney can be put in place at this point. The only loose part will be the small coil trigger pull weight spring that fits into a pocket in the top ridge of the trigger. I did, however, use the existing factory trigger pull weight spring on this installation, which I will cover in more detail later. With the trigger installed as received, it is ready for adjustment.

Cock the rifle and turn the front screw (sear engagement screw) in slowly until the rifle fires, and back this screw out about a half turn. This sets the sear/trigger engagement, which can be fine-tuned later if needed. Adjust the safety by cocking the rifle and pushing the safety to the rear. Turn the safety adjusting screw inward until it stops, but don't force it. Then Trigger parts for the factory trigger, from left, are the sear engagement screw, safety adjusting screw, and trigger travel adjusting screw.

On the Timney the parts are the sear engagement screw, trigger pull weight spring, safety adjusting screw and overtravel screw. back the screw off until the safety moves freely. Try the safety several times to be sure the rifle doesn't fire with the safety on or as the safety is released. There is a counterpoised balance between sear/trigger adjustment and safety adjustment. If one is adjusted be sure they are precisely coordinated.

As a final adjustment for trigger over-travel, the rear socket-head screw is turned inward until it makes contact. Then back the screw off for some trigger freedom after the rifle is fired. The trigger can now be finetune adjusted. I was able to adjust the new Timney trigger just below 1 1/4-pounds with safe operation but caution is advised in going too low a trigger pull.

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One end of wire rests on rear trigger lug giving it engagement tension. A similar lug is attached to the Timney trigger. This screw is conveniently attached by a few threads into a hole where part of a nylon plug was removed on the Timney trigger. The Original Trigger Spring As earlier mentioned, I chose to use the original, straight-wire type trigger spring when installing the new Timney trigger. The new Timney trigger comes with a coil spring that pushes upward against the sliding safety.

The sliding safety moves forth and back pushing the trigger pull weight spring inside its loosely fitting pocket. The spring provided was rather stiff as well, so I abandoned it and

used the Savage factory wire spring in lieu of the coil spring. Here a minor modification is required to use the Savage spring on the new Timney trigger. At the very back end of the Savage factory trigger there is a lug extended from the side.

This lug holds the extended wire trigger pull weight spring, pushing the rear of the trigger downward, engaging the sear and trigger. Here I simply added a screw on the new Timney trigger near where the Savage factory trigger has a lug. The screw conveniently fit into an existing hole in the side of the Timney trigger. Here there is nylon lock ma-

terial for the safety adjusting screw. I removed but a small amount of the nylon material to provide for a few screw threads.

I also used J-B Cold Weld to further retain While polishing the parts must remain perfectly square with no rounding of the hardened edges. the new shoulder screw. The existing wire-spring does an excellent job as a trigger pull weight spring and is fully adjustable. Though the Timney replacement trigger closely resembles the original factory unit, with minor adjustments and sear/ trigger polishing, I can strongly recommend its application for safe and reliable performance. AG

MAINTENANCE & REPAIR

Repairing Damaged Screw Heads on Used Firearms

BY WENDELL DEANER AUGUST 2010

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When contemplating a used firearm purchase the first thing I look for is rust. The next thing is “boogeredup” or damaged screw heads. Nothing screams amateur and abuse like a messed-up screw. By using ill-fitting screwdrivers countless side-plate and stock screws have been damaged beyond repair. Or have they? Negotiating a price is on the buyer’s side when confronted by a gun that has obviously been damaged by poor gunsmithing practices.

Damaged screws cannot be hidden any easier than the hostility of a disgruntled mother-in-law who thinks her daughter should have married an old beau who made more money than her honey. While as our wife’s mom can usually be shown the error of her judgment with time and effort, our ace in the hole is that most straight-slot screws that have been ruined can be repaired and it doesn’t take a shop full of lathes and milling machines to do this job.

Although this kind of shop setup is ideal, most of us are limited by our pocketbooks or inclination to a simpler and less expensive solution. In fact, handwork and the old-fashioned art of gunsmithing are necessary to do this job right. Common sense and Brownells again comes to our rescue. The tools we need are available. The knowledge is in this article. Unfortunately, the tools to do this job are not inexpensive, but the knowledge comes free with your subscription to this magazine. Study illustration one.

This shows a typical guard screw on a bolt-action rifle that we might see come into the shop everyday. What is actually damaged on the screwhead? As you can see, using a triangular screwdriver designed for a wood screw has literally rearranged the parallel slot. Its edges are unstraightened and the metal moved by this damage is piled up on either or both sides of the top of the screwhead. We have to put this metal back. What looks like a throw away screw can be saved with proper gunsmithing technique.

Notice how the metal has been piled on top of the screw head. This is what we must move back to its original position. where it belongs and, with patience, it’s easy to do. We could grind off the ridge created by moving the metal onto the top of the head, but that would be a mistake. The loss of the metal that is ground away would leave a dishd-out, beveled, unprofessional-looking channel.

It would create an actual detriment to tightening and loosening this screw by having less purchase on the slot, even when using proper tools. To repair the screw and reclaim most of the metal we must use a machinist’s hammer. The metal of the slot has been moved “violently” to the top of the screw by the torque of an ill-fitting screwdriver. Tapping “gently” in the direction of the slot will move the metal back towards its normal shape. This is not as difficult as it sounds.

The secret is to use a hammer with a smooth, polished face. A regular hammer will just chew the head up.

REPAIRING DAMAGED SCREW HEADS ON USED FIREARMS CONTINUED

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The author feels a four-ounce hammer is most useful. I recommend first practicing on something other than an irreplaceable screw or one from a customer's gun before you attempt the real thing. Messed-up screws should be easy to find in your spare-parts containers. I save all kinds of screws, springs, and any other kind of metal that comes across my bench. You just never know when it might come in handy.

Holding the screw is accomplished by drilling a hole in a 2x4 piece of wood that is slightly smaller than the thread diameter. The screw is easily threaded into the soft wood and held tightly when inserted until the head is resting on the flat of the wood. This is the ideal way to hold the screw. In general practice I normally chuck the screw into a vice with

leather or cork jaws. This will do for 90+ percent of this work. Mount this holder in your vise and go to work.

Start with light taps angled toward the middle of the slot. You will begin to understand the process when you see the metal moving in the right direction. A good magnifying visor is essential here. If your ministrations oblong the soft wood hole and the screw begins to slip, drill another hole and continue. A small, flat washer underneath the head will help stop the screw from digging into the soft wood and keep it from tipping.

The nature of this job is not to bang the piece back together by brute force but to easily rejoin it to near its original shape. But, the screw must not jiggle and move about or precision will be lost. I am a firm believer in the art of our profession. Any fool can drill a hole

or pound a piece of metal into submission, but I think you will agree. Save your "junk". That we have something that other people do not and that is a "feel" and an "eye" for the job we are working on.

We should have visualized the diameter and the straightness of the screw slot before we started working so we know when to stop when is almost where we want it. I guess you could do this job with a sledge hammer if you were good enough, but I rely on a variety of machinist's hammers, some commercially available, some not. For instance, one of my most useful hammers for final finishing was once gracing a chain on a "break here" fire alarm. How it came into my possession, I don't know for sure.

I'VE HAD IT SO LONG I REALLY CAN'T REMEMBER BUT I DO

REPAIRING DAMAGED SCREW HEADS ON USED FIREARMS CONTINUED

ORIGINAL PAGE 12

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use it. That's one of the advantages of being a pack rat. I may have had that thing since I've been a boy. With a polished head it's every bit a professional tool as my more expensive hammers. I find that for this job a four-ounce machinist's hammer seems to be my best friend. I usually expect this job to take about ten minutes or less to get it ready to sand and blue after the screw is placed in its holder.

How much to charge for each screw is up to you, but personally I get a lot of satisfaction by fixing these old guns up. By carefully tapping the metal back into place we're left with a screw slot that may be smaller than the original. Here's where we have to lose a little bit of the metal. Think of this metal as being in the way of the original slot. The way to remove it is to use Slot Files available from our friends at Brownells.

These small files have a working edge to cut down on the slot but a smooth face that will not work the sides of the slot. Since I bought mine they must have started making these files out of gold or some other precious metal. I won't talk about the price but you cannot do this job without these specialized files, so bite the bullet and buy them. These tools are not necessarily fragile but they will break if ham handled.

Screw Slot Files come in a set of three sizes 7, 9, and 11 which are 0.027, 0.035 and 0.043-inches (0.69 mm, 0.89 mm, 1.1mm)

in width. The files are especially ground to have flat, smooth sides and only cutting edges, perfect for this job. Most of our common gun screws can be repaired with these three files. For specialized work, including the thin European style screws, Brownells also offers a much larger set with matching edgers.

The price makes my head spin, but if you take on a lot of this kind of work they are invaluable and the usual quality of Brownells products makes it easier to justify the expense. Start with a file that is slightly smaller than the original slot. What we are trying to do, remember, is not only cut a usable slot but one that is closest to the original as our tools will take us. Work it down to the full depth of the slot and then finish with one closer to the original size.

It may not be exactly the same but you will be able to find a screwdriver to fit. We are left with a repaired and usable slot but the head needs a little more work before we can say we're finished. Take a small piece of 220-320 grit aluminum-oxide paper and staple it to an appropriate sized block of wood. Mount the block into a solid vise. Chuck the screw into a hand drill without damaging the threads. On slow speed push the head into the sandpaper and lightly polish any burrs left by our files.

Reposition the Go easy as mistakes here can misshape the head and ruin the job. head on the sandpaper as need be but go slow and use a light touch. It doesn't take much force and by using the drill we can actually grind the screw out of shape. What's nice is that the circular motion will leave a nice, professional finish to the head. The next to last step is to harden the head by using heat treatment.

I personally find this process to be unnecessary for most of our repairs, but if you are interested I advise you to purchase some Brownells Hard-N-Tuff Steel Hardening Compound. Mine came with easy to follow instructions and there are many treatises on heat treating metal available to the scholar both in print and on-line. I say the next to last step because the final thing we need to do is reblue or re-brown the screw-head to match it to the appropriate firearm.

I find this easiest to do with a little cold blue or brown. If working on a high-dollar piece or trying to absolutely match the other screws on your job, I refer you to the many references on refinishing metal. This is one job where you will find it easy to please your customer when showing the finished product. Where a damaged screw stands out, a repaired one will become invisible. He might have to ask, "Which was the one I wanted fixed?" AG

METALWORKING

It's All In The Springs

Spring function is critical in any self-loading firearm, especially 1911s.

BY ROBERT K. CAMPBELL AUGUST 2010

ORIGINAL PP. 14-17

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When a customer asks you to regulate or debug an automatic pistol he doesn't always hand you a platinum credit card to use for the expense of parts. Experimentation is not something many customers are willing to pay for. Today there are so many makers of parts, including springs and guide rods, that we may find ourselves confused. I think it is obvious that some parts must be better than others while some are better suited to competition than military and police use.

Heavy loaded hunting handguns or other pistols designed for special purposes are a common consideration. When it comes to service guns or those used for personal defense we must be very serious and choose only proven, quality parts. Experiments are fine with personal handguns. This is exactly how I learned much of what I know concerning the 1911 pistol. Commonly produced O-frames such as the 1911 Government Model, 10mm pistols, and the Commander all have factory specifications.

Then there is the .45 Super, .460 Rowland and other, less common variations. A consideration that must be foremost is the

proper springs for the application. Not all springs used in the 1911 are coil springs, although these get the most attention. The sear spring is a flat spring with three fingers in front of the grip safety. All sear springs are not created equal. The detents and protrusions of the sear spring are not as well defined on some leaf springs.

If we wish to improve upon the Colt then we must use good material. I have tested any number of so-called improvements. Twenty years ago I used a special sear spring with an odd curl in the leaf that bore against the disconnect. It often kept the pistol from firing! I have since returned to Colt and later, Wilson Combat, Ed Brown and Dave Berryhill parts. Let's look hard at the sear spring. As I refer to them, left or right is from a rear perspective.

The left arm of the sear spring regulates pressure of sear engagement or contact with the hammer hooks. This leg is sometimes bent forward toward the muzzle to increase pressure upon the sear, forcing it into the hammer hooks. This is an expedient used if you experience the hammer following the slide during the action cycle. I

have to admit this expedient always works but I am more likely these days to replace the entire sear spring rather than bend one.

As a rule, I replace action components in matched sets from one manufacturer. A full auto burst is not something I have ever experienced and I wish to keep it that way! I suppose I trash some internal parts just because I can but in the end the handgun is all the better for it. The middle arm of the sear spring bears upon trigger compression. The arm may be bent forward to increase trigger pull weight and bending rearward reduces it.

In testing with the RCBS registering trigger pull weight gauge I've found the range of adjustment possible to be about eight ounces up or down. I suppose some handguns may register a bit different but this is an accurate prediction. Note, if you bend this spring too far it will take pressure off the disconnect. Despite the availability of what appear to be high quality,

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There is no way to know by just looking. Keep these stored in original packing! durable parts if more than a handful of bends are made in the spring over time I tend to discard and replace it. Most of the 1911s I work with are defense handguns and I am very serious in this regard. I will restate that if we are working with a competition handgun a bit of experimentation is a another matter. The right arm of the sear spring provides pressure for the grip safety.

I appreciate the grip safety of the 1911 very much and consider the grip safety a fine design feature. On the other hand, some shooters find the grip safety a problem, especially with the GI type. Before the general availabil-

ity of affordable, high-quality beavertail safeties, a common expedient was to bend the right hand arm of the sear spring forward. This results in a faster activation of the piece as less pressure is registered on the grip safety. Firing pin springs should be inspected from time to time.

Some modern 1911 handguns have firing pin blocks. For those pistols lacking this feature I recommend using a heavier firing pin spring instead. This heavy spring will prevent the firing pin from running forward and cracking the primer if the pistol is dropped on the muzzle. The Series 80 design is not immune from such a discharge despite the firing pin block.

If the hammer is lowered on alive This spring can cause the handgun to have fits of malfunction and battering if not properly regulated. round and the trigger is not immediately released until the very end of the hammer's downward travel under control of the shooter, the firing pin may be left in a forward position. The 1911 really should be carried cocked and locked! If the Series 80 is carried hammer down on a loaded chamber there is a possibility that the firing pin block is not positively engaged.

A heavy Wolff firing pin spring is a good idea for all 1911 handguns. For those using +P loads a heavy firing

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After thirty years of using the 1911 the author recommends heavy duty firing pin springs across the board. In the text the author outlines the individual function of each finger. Deviate from specifications at your own risk! pin spring helps keep the firing pin from running forward as the slide slams into battery. I recommend them across the board. Note that the tapered end of this spring is oriented toward the muzzle of the pistol.

When checking a handgun for faults, you may find the occasional firing pin that does not retract quickly enough. If you see marks on the primer of a fired case resembling Glock firing pin strikes then the firing pin of your 1911 is not retracting quickly enough. Obtain anew firing pin spring. The greatest single misunderstanding in spring technology comes from the mainspring. The mainspring stores energy as the hammer is cocked and then releases that energy, sending the hammer crashing forward.

The 24 pound factory spring gives the hammer sufficient whoomp to crack practically any primer, including hard military types. Reduced mainsprings are longer than standard power springs and easy to recognize. The mainspring also controls hammer resistance to the slide and performs an important role in the function of a locked

breech pistol. The slide must overcome 24 pounds of resistance when moving rearward and cocking the hammer.

If you desire to use lighter target loads, such as the classic 185 grain SWC at about 850 fps, the simple expedient of fitting a 16 to 18 pound mainspring will give a lighter action and you may not have to use a lighter recoil spring.

At one time it was standard operating procedure for shooters to replace the factory recoil spring of the Colt Gold Cup to convert these pistols for use with hardball ammunition but many shooters did not take into account the lighter mainspring and as a result many such pistols were battered. Mismatched springs can be a real problem. An example might be a novice who fitted a heavy recoil spring for use with +P loads but then installed a light mainspring to improve the trigger action.

Obviously this is contra indicated and out of balance. The recoil spring is often coupled with a full length guide rod. Several of my most accurate 1911 handguns use a FLGR, but not all. If the pistol is to be used in a hostile environment with a demand for frequent cleaning, I would not fit a FLGR. True, the FLGR is not a spring but we really need to discuss spring accessories as well. As an example the shock buff is quite popular and I am certain a shock buffer slows wear and tear on the handgun.

But again this little piece of synthetic material is counter indicated for use in a dedicated defensive pistol. There are a number of reasons. First, the buffer impedes complete rearward motion of the slide. If you have a combination of a dud round and a small slide window of the GI type then you are going to have a very difficult time clearing the malfunction and will have to drop the magazine and let the loaded round fall out the bottom of the magazine well.

There is no problem ejecting spent cases but even in administrative handling and unloading the piece there is difficulty. This varies from gun to gun but I do not wish to use a shock buff in a personal defense handgun. I have a strong suspicion that a shock buff may alter the spring rate. I like shock buffs for practice and for competition guns but do not carry them in defense handguns.

As for the recoil spring I think shooters understand the recoil spring better than ever before, but occasionally we find a mismatched recoil spring. The standard 16 pound recoil spring will do just about anything we need to do in a Government Model .45. Heavier springs are needed only when +P loads are used or when we perform a caliber conversion. It is important, however, that the recoil spring is changed every three thou

IT'S ALL IN THE SPRINGS CONTINUED

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sand rounds or so, perhaps a bit more frequently with +P ammunition. If you keep anew spring on hand it is easy to tell when the spring needs to be replaced. When the spring has lost an inch of free length it is well worn and needs to be replaced. The plunger tube spring seldom gives trouble. Rather, the plunger tube comes loose from its staking and causes a problem long before this little spring gives us any trouble. Just the same we need to be aware of its function.

The plunger tube spring ensures the slide stop and slide lock safety are properly locked and indented. If the spring is not strong enough then neither of these parts will function correctly. Another small spring that doesn't get much attention can really ruin the day of a 1911 shooters. I have experienced several problems with the magazine latch in quality 1911s during the previous few months. In one case I purchased a parts kit that was quite simply done on the cheap.

The magazine catch assembly was too cheap to keep working and stopped a fifteen hundred dollar gun from functioning during the first range test. On another occasion a rather expensive and heavily advertised factory handgun suffered exactly the same problem for the same reason. Although well finished, this handgun was basically a parts gun with a slide and frame made from an outside vendor. The parts seemed to be catch as catch can. There is nothing wrong with this program as far as it goes.

Both Smith and Wesson and SIG have put together — and I mean this in the literal sense of putting together rather than manufacturing — excellent 1911 pistols by outsourcing parts from first class vendors. But when the parts are purchased on the cheap there are many problems. The pistol in question was under warranty but time and shipping costs caused the author to replace the factory unit. Even simple parts like a magazine spring can definitely cause a problem.

In this particular application I have enjoyed excellent luck with ISMI replacement parts. When it comes to magazines and magazine springs I wish to stress that magazines are a high wear part that should be replaced when they give problems. They are subject to wear, abuse, and hard knocks. Magazine lips are bent, often beyond repair. I find 1911 shooters cling to magazine past their useful life and replace grips more often! Go figure. Magazine springs usually do a fine job.

By the time magazine springs are worn out the magazine body probably is as well. However, for best results I often replace factory springs with quality premium springs. I ordered a substantial quantity of ISMI springs some time ago and still use them with excellent results. The main problem encountered with magazine springs comes when the recoil spring is not mated properly with the magazine spring. If we use +P loads slide velocity is increased.

When slide velocity is increased the ability of the magazine to feed properly is compromised. The slide may outstrip the ability of the magazine to feed resulting in short cycles. The need for a heavy duty recoil spring is clear. There is also a possible need for heavier than normal magazine springs. Heavy duty magazine springs also are a good idea for personal defense application. In the case of eight round magazines it is asking a lot to feed from full compression to almost no compression with the last round.

Over long periods of time I have found seven round magazines more reliable in extreme testing. The new breed of eight round magazines, including the Wilson Combat ETM, certainly have addressed this issue and see to answer every fault with eight round magazines. They are modestly longer than the seven round magazines, offering a larger space for a longer, strong spring. The final spring we will address is the extractor.

Original specifications for the extractor were that it be made of tool steel but they have been made from everything else it

seems. Extractor tension is debatable, as I have measured extractors with very little tension that worked just fine. The extractor must be a good fit. It must not clock or move in the extractor tunnel. I do believe there is a specific upper and lower end for extractor tension.

In the old days we simply shoved a loaded .45 ACP cartridge under the extractor with the slide removed from the frame. If the cartridge did not fall out all was well. If it did, the extractor did not have enough tension. This is still an acceptable preliminary. Sometimes there is a decade's supply of varnished oil and unburned powder under the extractor. Today the accepted technique is to test extractor tension every one thousand rounds or so.

Weigand supplies the shim for checking with a conventional trigger pull gauge. Slip the gauge under the extractor and pull the extractor with an RCBS trigger compression gauge. I often test and reset extractor tension on the 1911. To increase tension I simply half-way remove the extractor while still resting in the extractor tunnel. Turn the extractor 180 degrees away from the original position and bend the exposed end away from the slide.

Naturally, an extractor that loses tension more than once should be replaced. The most recent fix I have used is to replace a well worn Colt extractor with the Ed Brown extractor. When you fit the new extractor, simply file the hump until the extractor fits cleanly with good tension. A generation ago Colonel Jeff Cooper remarked that peening the firing pin stop was standard operating procedure for the 1911.

I used to do so but if the firing pin stop (or plate as it is sometimes called) is too loose peening by striking with the punch and hammer will only keep it from falling out. A too loose firing pin plate will allow the extractor to clock or move in the frame. Peening is a band aid. Fitting a proper oversized firing pin plate to the slide and then filing the plate to a good tight fit is the proper procedure. AG

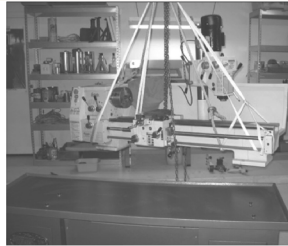
FROM THE ARCHIVE

Lathes, Mills, Drills

Part 1: Key Considerations and Used Equipment. Unless you have unlimited funds, buying new or used machinery can be a challenge. Here are some points to consider when making these big purchases.

BY RICHARD MACLEAN AUGUST 2010

ORIGINAL PP. 18-22



Above: Helpers can manage small machinery of a few hundred pounds, but with industrial-sized equipment a hoist and/or other rigging is a must. You also will need sufficient vertical clearance. Pictured is a Grizzly combination lathe/mill being positioned on its table to be later rolled into place on special dollies.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

There are gunsmiths in the faroff Land of Oz who have access to unlimited floor space, three-phase power, high bay entrances and money to buy new Bridgeport vertical mills, South Bend lathes, and Dayton floor drill presses. But for the rest of us who live in the real world, the pitfalls of buying metal working machinery are as numerous as the options. This two part article was written primarily for the home or hobby gunsmith or the professional with a small shop with limited space and funds.

Indeed, for the first-time buyer who might be tempted to grab a “great bargain” advertised on the Internet and located halfway across the country this article is a must read. Some aspects covered also may apply to larger shops since many of the points covered are independent of shop size. Commercial facilities mass producing gun parts fall outside the scope, however, since

they typically use large CNC machinery and are located in industrial parks set up to handle such equipment.

Weight, Cost, Power Supply Before even getting into the range of factors that influence the type of equipment to buy, it is first worthwhile to step back and consider the three factors which, in total, make the purchase of mills and lathes so problematic. First, to state the obvious, they are extremely heavy. New or used, a lathe suitable for rifle work can weigh half a ton, often more. A full-sized industrial vertical mill can weigh more than a ton.

They are expensive to ship and set up, requiring specialized equipment or facilities such as an unloading You also will need sufficient vertical clearance. Pictured is a Grizzly combination lathe/mill being positioned on its table to be later rolled into place on special dollies. dock, forklift truck, lift gate, pallet jack, hoist, and so on. That used \$1,000 “smoking deal” can suddenly

become an expensive headache to transport and position in your workshop. Shipping is the most straightforward aspect.

If the unit has to be placed on a pallet, or crated and then put in a truck or on a flatbed at the sellers end, the moving costs can escalate rapidly. Some used equipment sellers are set up to handle this operation efficiently, but you will face the challenge at your end. Cross-country shipping trucks do not necessarily have lift gates and few small shops have a dock. If the unit has to be transferred to a delivery vehicle with a lift gate, that may be an additional charge.

The shipper may refuse to drive on a home driveway for fear of cracking it and may not be willing to place it inside the garage or shop without an extra fee. There is also the issue of lifting it off a pallet, mounting heavy components and placing the unit in its final location. If the floor has to be drilled and the mount hole locations are not known precisely in advance,

LATHES, MILLS, DRILLS CONTINUED

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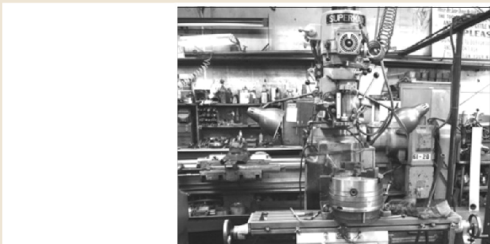
Above left: Static units are approximately one-third the cost, but drop HP rating by one-third and you risk burning out your motor under heavy loads.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Above right: Most used industrial machinery requires three-phase power. Unless you are located in an industrial park you will need a converter.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Below left and right: Purchasing used industrial mills and lathes such as these can be a low-cost alternative to new machinery. But the "bargain of the century" found on a website auction may turn out to be a nightmare if you don't do your homework and make the purchase wisely.

ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED



Below left and right: Purchasing used industrial mills and lathes such as these can be a low-cost alternative to new machinery. But the "bargain of the century" found on a website auction may turn out to be a nightmare if you don't do your homework and make the purchase wisely.

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Unless you are located in an industrial park you will need a converter. It may not be possible to offload and place it in one step. Full-sized mills may be taller than the available door opening, especially if it is shipped and moved on a pallet. The "rigging hardware" (i.e., a forklift truck, straps, and extended forks) may be taller than the ceiling clearance. A shipper will not wait around while you remove the motor to make it fit.

All of these issues can be handled if commercial heavy equipment riggers are used, but this drives up the cost. One such rigger quoted me \$600 to pick up, transport a full-sized

vertical mill thirty miles across town, and set the unit in place. That \$2,000 bargain was now \$2,600. It still could have been a bargain, but the important point is that shipping and rigging costs are not insignificant and must be thoroughly researched prior to purchase. The second point is cost.

As Einstein would say, "It is all about relativity." Used and even new "economy" equipment is costly, but not inordinately expensive. If it is a \$30,000 unit, then the shipping cost is a relatively minor consideration. But for full-sized, used equipment that can be bought for \$1,500 Below left and But the

"bargain of the century" found on a website auction may turn out to be a nightmare if you don't do your homework and make the purchase wisely. to \$5,000, shipping and setup can be a major consideration.

Even if the seller is willing to refund your money if you are not satisfied with the unit, these sunk costs makes the purchase of used equipment costing a few thousand dollars a much riskier endeavor. It is hard to justify the time and expense to fly across the country to examine a \$2,000 unit, but it would be foolish not to



Left: Most small shops do not have a loading dock or a forklift. Be sure to factor in the cost to load and unload equipment onto the shipping truck. This 1,200-pound delivery required a lift gate and pallet jack.
ORIGINAL ARCHIVE IMAGE • PERMISSION CONFIRMED

Be sure to factor in the cost to load and unload equipment onto the shipping truck. This 1,200 pound delivery required a lift gate and pallet jack. do so for a used unit costing tens of thousands of dollars. Finally, access to power is another consideration for those not residing in an industrial park. Used equipment advertised on the Internet through sites such as e Bay, Surplus Record, Equip Matching, Machine Tools, Used Equipment Network (UEN) and others often contain the horsepower specifications, nothing more.

To the novice, a two horsepower motor may not seem like much of a load on his system, but if it is three-phase he may be in for a big surprise when the unit is ready to be wired. Most industrial machinery is three-phase, not single-phase. Three-phase power is more economical and energy efficient with simpler motors running more smoothly. A start capacitor is unnecessary and the individual lines are the same size and carry the same current for a balanced load.

If you do not have access to three-phase power there are three options. First, request your power company supply three-phase power. In most cases, this would be

outrageously cost prohibitive for a home workshop. Second, change the motor, however, it can be expensive and tricky finding a compatible replacement motor. The third, better option is to buy a converter.

Rotary phase converters are three-phase motors that take single-phase input current and, with the help of run capacitors, spin a motor under no load (i.e., idling) generating three-phase output current to the machinery. Using a rotary converter, it is possible to operate the machinery with no loss in power and efficiency. A rotary phase converter is the most flexible and can handle any type, number, and size of load within its rating.

For example, a single 7.5 horsepower converter could simultaneously run a mill and a lathe each with 2 horsepower motors, or it could sit and idle with no units running. Static phase converters generate power to start (i.e., kick over) the three-phase motor. Since three-phase motors do not have start or run capacitors this “boost” is done electronically, but thereafter the motor is actually running on single-phase. Static converters are significantly cheaper but less powerful than rotary units.

For example, a five horsepower rotary converter costs approximately \$500 versus \$125 for a static unit, but onethird of the horsepower rating of the motor is lost with the static converter because you do not have all phases. Picture a six-cylinder engine operating only on four. If you overload the lathe or milling unit's motor you risk burning it out.

Static converters should only be used to run a moderately loaded single motor that does not have high initial load applications such as compressors and resistive load units such as welders. A third type of converter is a transformer-based phase converter. They are tuned for highly loaded equipment such as air compressors and hydraulic pumps and can provide ondemand power with no losses. These are typically priced in between static and rotary phase converters.

Be they single or three-phase motors, the larger mills and lathes are almost always 240 volts. It is possible to buy some of the smaller-sized new and used units with 120-volt motors, but this comes at a performance cost. Higher voltage motors run cooler and the supply-line sizing is smaller. For the home gunsmith that does not have 240-volt outlets in the garage or shop and must hire an electrician to install an outlet, it is another cost that must be taken into consideration. What Type of Machinery?

Next to the Land of Oz is Dara Adam Khel in the northwest frontier of Pakistan where guns have been made with files, drills, hammers and the like for more than a hundred years. There is something that can be said about the value of basic hand tools and machinery such as bench grinders and drill presses. For the rest of us in the modern world aspiring to do more elaborate gunsmithing, one reaches the point where lathes and mills become necessities.

There are nearly infinite options, all of which depend on what you want to accomplish. First, some universal rules. Buy the absolute best you can afford with an eye toward the long term. It is impossible to envision all the possible future gunsmithing projects you might do, so plan for the absolute widest range your budget can afford. If you have it, other projects will come. You might be gunsmithing, but other, non-gun projects invariably will arise.

Everything else being equal, equipment that is big and heavy is more likely to produce more uniform cuts. Mass increases rigidity and dampens vibrations. While bigger is generally better, there are exceptions. For example, a six-inch chuck weighs about 25 pounds and a 12-inch weighs about 125 pounds, hardly something one can easily change out alone. Cutting a firing pin on a 14" X 40" lathe would not be as easy and accurate than if you used a small, precision unit.

Costs increase almost exponentially as the precision of the machinery or tooling increases. Your tooling should match both the job requirement and the machine's capabilities since the outcome will be as precise as the weakest link. Power feeds facilitate smoother

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LATHES, MILLS, DRILLS CONTINUED

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Above: Before buying used equipment know what you are getting into in terms of excessive wear, missing or broken parts or key accessories. Way grinding and scraping can restore used mills and lathes to their original specifications, but it is extremely expensive and performed on large, specialized industrial equipment such as this 5' x 5' x 20' Gray planer modified with grinding spindles and a milling head capable of holding 0.0001" per foot. Photo source: Gallery Of Machines.

ORIGINAL ARCHIVE IMAGE - PERMISSION CONFIRMED

cuts than those that are possible to do manually, even with experience. The more specific the task a machine is designed to perform, the better the results and/or the more easily it can be set up to accomplish that task. For example, a lathe can do milling, but the set-up can be difficult and the range of possibilities limited. Finally, do not even think about doing milling with a standard drill press. The bearings are not designed to handle the lateral loads.

The chuck mounted with a Morse taper and not positively drawn up and locked in place can dangerously vibrate free. For the hobbyist gunsmith it is, of course, possible to farm out a specific operation to a machinist or gunsmith with a well-equipped shop to perform a one-time machine operation. But even the simplest of operations can involve a minimum shop "set-up" charge approaching a hundred dollars.

The "relativity question" discussed earlier also comes into play here since it does not take too many repeat operations to justify used or new economy machinery. There is also the question of timing. While you may wait a few days at a regular machine shop, the wait at some gunsmith shops can stretch out for months. This, of course, assumes that you live in an area where such services are readily available.

We will not even go into the legal ramifications of machine shops without an FFL working on gun receivers as there have been recent changes in the definition of "manufacturer" of a firearm. This is a complex legal area, and some machine shops may flatly refuse work on gun receivers or even parts under any circumstances. Consult your lawyer since these requirements may vary by locality and it is serious stuff.

Assuming that you want to buy and not have someone else do the work, just what types of equipment do you select?

High-quality bench or floor drill presses are not very expensive, so this is first on the list of must-buys along with a bench. Way grinding and scraping can restore used mills and lathes to their original specifications, but it is extremely expensive and performed on large, specialized industrial equipment such as this 5' x 5' x 20' Gray planer modified with grinding spindles and a milling head capable of holding 0.0001" per foot. Photo source: Gallery Of Machines grinder/wheel polisher.

In choosing a lathe or a mill, first consider the previously mentioned universal rules. If you are certain that you will only work on handguns, then one of the smaller lathes or mills would be just fine. Small is generally cheaper, but again the precision factor

comes into play. Some small, precision lathes are relatively expensive, but there are exceptions with the import market.

Anew 7" X 8" (swing Xbed) unit recently listed at \$400, claiming a "spindle accuracy of 0.0004." More about both buying online and the import market later. If you must choose between a lathe and a mill because of budgetary constraints, consider buying the lathe since you can perform limited milling operations on a lathe, but not the reverse. Palmgren and South Bend have manufactured lathe milling attachments which clamp on the tool post just like an ordinary tool.

Work can always be held the old-fashioned way with angle blocks, vises, and clamps. The book *Milling Operations in the Lathe* by Tubal Cain is a great reference. Used Equipment Unlike hand tools, bench grinders, and table saws, lathes and milling machines are too specialized and expensive to be found at yard sales. Finding one by word of mouth might present one of the best opportunities if, in the process, you can also obtain some detailed background on the unit and the reasons for it being sold.

In most cases, buyers have to rely on classified newspaper ads, used equipment brokers, or Internet postings. The Internet has

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revolutionized equipment resale since you can sign up on some Web sites and be automatically notified if a unit matching your specifications arrives on the market, literally anywhere in the world. The marketplace is awash with used equipment and the process can be quite reasonable even for some of the brand-name units. That is the good news. The bad news is that not all of this is being created by companies upgrading to more sophisticated and faster CNC units, but by US-based manufacturing moving overseas.

While the abundance of units advertised online may seem encouraging, in reality, the sheer number of choices could be overwhelming if it were not for weight and cost. You just cannot casually buy one, try it out, and ship it back if it does not meet your expectations. Two identical, vintage brand-name machines can differ markedly depending on how well they were maintained and how much they were used, or abused. First, photographs can sometimes make equipment look much better or worse than it really is.

A clean-looking unit may be worn and major components about to break. Conversely, that filthy looking unit may be a gem in the rough. Second, it is easy and cheap to repaint a unit, but rebuilding units can be extremely expensive relative to the purchase price. Replacement parts may not even be available for very old or off-brand equipment. There are more than thirty companies across the country that can grind and scrape ways, but these operations are costly, especially if an entire unit is to be reconditioned.

For example, a Series 2 Bridgeport 9"X42" vertical mill can cost as much as \$7,000 for all three axes. On top of that add shipping. This is not to say that professional restoration is out of the question. It all depends on the extent of the wear, the number of axes that may require reconditioning and the final tolerances that are desired.

It is best to consult with a remanufacturing specialist such as Derek Hartman at Gallery of Machines in Marathon, New

York, before you buy a specific mill with known wear problems. Because of the preceding cautions, it is always best to inspect the unit directly. Generally, this means that you are limiting your search to the region in which you work, unless you know a knowledgeable person you trust in the area.

There may be exceptions such as buying through a broker with a stellar reputation that will back their units and include some prior agreement on return shipping costs. Some used machinery suppliers, such as the previously mentioned Gallery of Machines, are also remanufacturers. In other words, they can inspect, state the condition and repair a used unit in inventory to the customer's specifications. Of course, you will pay a premium by going through a broker compared to a direct purchase from a private owner.

Ideally, you should not only see the machinery in the shop where it was used, but actually see it in operation through its range of speeds. If gears are chipped or missing, or if the bearings are excessively worn, it will become obvious. Seeing the unit in its original shop also gives an indication of the type of care it may have received. If the place is a mess it is hardly a good indicator that the unit was well cared for. If the unit is in a resellers warehouse you really have no idea of its use and care.

I have heard horror stories of mills being routinely used as bearing arbor presses and lathes used as holding devices to straighten shafts mounted between centers and beaten with hammers. If you cannot see the unit in operation, then the amount of play in the bearings may give some indication. Replacing bearings is expensive. There is also obvious stuff like someone ran the carriage into the chuck.

The bed's ways are one of the most critical areas on a lathe and generally wear occurs at the point of most use, namely, near the chuck. A good indicator that wear is not excessive is if the carriage binding screws can be tightened to the maximum near the headstock and still be moved all the way to

the tailstock and if the keyway on the lead screw is uniform along its length. The same goes for checking the half nuts on the apron and the amount of backlash on the carriage and cross slide.

If they are way too sloppy and tightening the adjusting screws and nuts cannot fix it uniformly over its length of travel, it may be too worn for the projects you have in mind. A similar inspection can be done on a mill. For example, it may operate perfectly in the center of a 42-inch table, but bind when at either end of its travel.

Again, much of this can be repaired, but repairs such as way grinding and scraping can be expensive, especially considering shipping costs and could potentially overshadow the purchase price. The current owner may or may not be willing to allow you to set up dial indicators to check runout, alignment, and so on. These measurements can be time consuming and try the owner's patience.

Not only that, you will need to know what the original specification were, what an acceptable amount of wear is reasonable, and how to take the measurements. Perfect alignment in one axis may or may not indicate alignment in another. Still, after all these cautions, the thrill of the hunt for that diamond in the rough is a powerful force. A clean up and a coat of paint might transform a mess into a miracle of machining precision.

Just go into the search with eyes wide open and be very patient because it could take many months to find something local, especially if you do not live in a heavily industrialized area.

Coming Next In Part 2 we will provide guidelines for sizing lathes and mills for gunsmithing work, discuss the current state of the import market, and examine "three-in-one" combination units that can be a practical choice to those who need to perform lathe, milling and drilling operations but are on a budget and have limited space. AG

METALWORKING

Reader Forum

BY AMERICAN GUNSMITH EDITORS AUGUST 2010

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Spring field XD I would like to know how to remove the front and rear sights from the XD 9mm pistol. Can they be drifted out with a brass punch and a hammer? The front sight of the XD has no tenon. It is dovetailed into the slide from right to left and removed from left to right. The rear sight is also dovetailed, installed right to left and removed left to right. A brass or nylon drift should be used.

Rossi Single Shot I am writing requesting information on reassembling a Rossi Single Shot Youth Matched Pair Combo, .410/.22 LR. The firing pin was broken and it was brought to me in pieces. I have a new firing pin from Braztech but they wouldn't give any information on how to install it. I have figured out where all the pieces go but would like to know the order of replacement. A good exploded parts drawing would help. The best place to secure a schematic is from Braztec.

Be sure you can give them the model number.. P38 A co-worker brought me a P38 he received from his father and asked if I can tell if it is safe to shoot because of tales that these guns have been sabotaged at the factory. On the left side the slide is stamped "P38" then "byf 44", then "2191 a." On the right side of the slide is stamped three horizontal lines (each lower line is shorter than the one above) with "Wa A138" under the lines.

Next to that is stamped a German eagle holding around with a swastika in it and two stamped horizontal lines, again with each lower line is shorter than the one above, with "Wa A135" underneath. I assume the 2191 on the left side of the slide is a serial number? My research tells me that the "byf" indicates that it was built at

a Mauser factory and I'm guessing that the "44" might indicate the date of manufacture. Can you help me with any further research with this gun?

Is there any way of telling whether this gun was one of those that were possibly sabotaged during manufacture? The gun appears to have been fired. Finally, if it is indeed sound, is there a danger with shooting modern ammo as compared to that produce back in the 1940's? Jerry If the pistol was manufactured or assembled in a Nazi-occupied country, sabotage is a definite possibility. Your best source for determining where the gun was made is the NRA Museum, Waples Mill Road, Fairfax, VA 22030.

Send them photos showing both sides of the pistol and include all the markings along with a stamped, self-addressed return envelope. Mosin Nagant, Dragunov Stuart Reed Flaxville, MT Some time ago you fielded a couple of questions about difficult extraction of spent cases from a Turkish Mauser and a Mosin Nagant. The Turkish Mauser could have a rough chamber, rough bolt face or excess headspace. The Mosin Nagant is probably suffering from burrs in the mouth of the chamber and roughness.

In my experience the Soviets had a hard time getting the chambers uniform during the war. What I usually do is run a chamber reamer into the chamber until it slightly marks the rim seat and then polish the chamber with a strip of one-inch wide emery cloth in a split rod run by a power drill. The Dragunov problem in the January issue may be solved by replacing the hammer, trigger and disconnector with Tapco parts for the AK. The problem may be too tight headspace.

It may also be debris in the firing pin channel caused by an oversize firing pin hole. This hole should not be larger than 0.095-inch. On aside note, I am no longer be working for Century Arms as of January 1, 2010. I have enough business to go full time in my shop. Keith You have been an invaluable source of information and assistance in the past on foreign and domestic guns, both handguns and rifles, and military and former military stuff in particular.

Hope this brings a whole bunch of new business your way from our readers so we're publishing your email address. Bob Erma .22 Auto I was sure I had seen something in American Gunsmith, but my extensive index turned up nothing. What do you have on disassembly and cycling/reliability for the Erma .22? "Charlie" Nothing to date in the publication with the possible exception of another reader who handed this Luger look-alike.

Place the emphasis on the "look-alike." Except for the toggle, any similarity between this Erma .22 and the long-time German sidearm is missing. Try two other sources: Bob's Gun Shop and "Erma Pistols" on the Internet. Bent Gun A friend has a Winchester Model 70 that is about ten years old. It is chambered in .270 Winchester with a tapered barrel, no front sight and a plastic stock. During the hunting season the gun was sticking out of a four wheeler and hit a tree.

The stock is broke at the wrist and the barrel is bent. By looking at the bend along the outside and view down the bore it is definitely no longer circular. Can the barrel be straightened? Who would be a good choice for anew barrel and stock? Ernie Bennett SFC, US Army (Ret.) Weston, WV

READER FORUM CONTINUED

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Well, at least it isn't a pre-1964 model! We think your best course of action would be to return the remains to Winchester. It would probably take them less time to turn around repairs on the damage, especially if it extends to the receiver and damage is a distinct possibility at the junction of the receiver and the barrel. The company is Browning/Winchester these days, and can be reached at Tell your friend the cost of the carelessness could come close to equaling that of a new rifle. That shock remains to come.

Winchester M100 I had a Winchester 100 come in my shop that a customer had cleaned but the bolt could not be moved far enough to the rear for the operating slide assembly to clear the forearm and allow the barreled action to be lifted out of the stock. I racked my brain until I found that during reassembly my customer either assembled the gun with the hammer in the fired position or it was knocked off the sear during assembly.

If this happens and you install rear guard screw (screw #27 in The Gun Digest Book of Exploded Long Gun Drawings) the hammer will not have enough room to pivot all the way back to cock or chamber around and this will jam the bolt too far forward to allow proper disassembly. My cure for this problem was to first remove the magazine, then remove the rear guard screw. Use something to reach up through the magazine opening and push the hammer to the rear until it is cocked or caught by the sear.

Put it on safe and continue with the assembly or disassembly as normal. Mr. Lucien Langois wrote in that he had this problem (January 2010 Forum.) Thank you, Preston. We're passing this along to our readers although the issue Mr. Langois was facing led us to believe his problem was not associated with improper reassembly because we faced this same problem with the

first Model 100 we ever serviced. The problem was self created because we weren't holding the cocking lever fully to the rear as we should have been.

Trapdoor Springfield A customer has an original 1873 trapdoor Springfield (.45-70) and would like me to check it out to determine if it's safe to shoot low-pressure factory smokeless ammo that I recommended. Besides checking headspace and a general inspection of the overall condition and integrity, what specific things should I also look at and check? John Vito Hope you can get the following advice to your customer pronto!

Though we haven't heard of any there may be commercially made black powder/smokeless equivalent loads available. Check with black powder, black powder projectile and black powder firearms manufacturers for possible sources. Warn your customer not to fire the Springfield with any other type of smokeless load! Equally important, you did not specify whether the gun was a rifle or carbine.

If the latter, it might have been a US Calvary model which only contained a Should this be true of the Springfield on hand, the equivalent load should be for .45-55 and not .45-70. We assure you, in a gun more than 100 years old these matters are not to be trifled with. Preston Parts Interchange I have a Sears Ted Williams Model 75, 20 gauge autoloader. My Numrich book does not show an interchange. Thumbing pages I found a High Standard Supermatic Deluxe that looks very similar.

Do you have any info in your library? I think the major problem with this one is dirt and a possible weak action spring. The bolt closing is not positive. James Look in the Cross Reference section of your Numrich Gun Parts Company catalog. If it says the Ted Williams was made by High Standard you may have a chance at interchangeability. In this is the case, check in with G. W. Elliott, Inc. who may have parts. AG

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