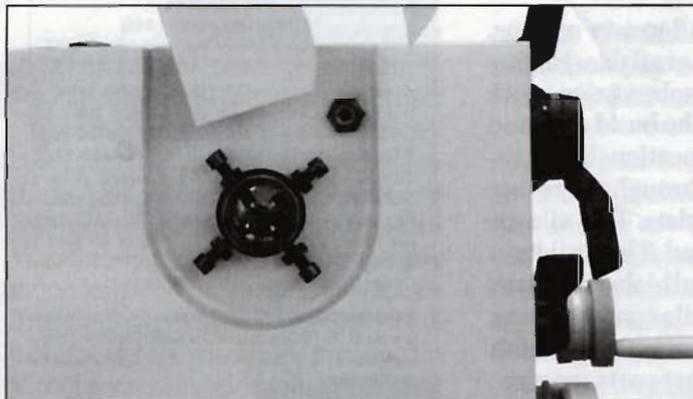


# AMERICAN GUNSMITH

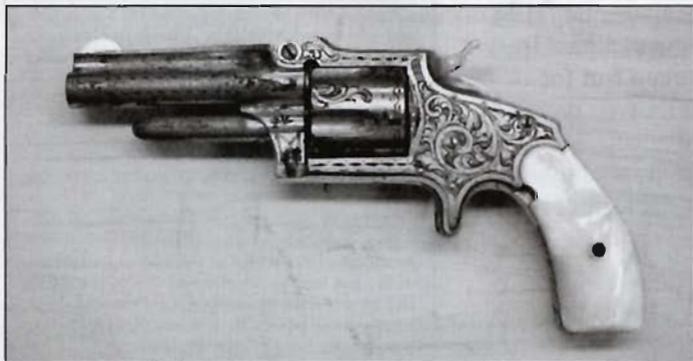
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# Lathes, Mills, Drills

## Part Two: Picking the right size and the import machinery market.

by Richard MacLean

**T**here are gunsmiths in the far-off 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. For the rest of us living in the real world the pitfalls of buying metal working machinery are as numerous as the options. In Part One of this series we discussed key considerations in buying industrial-sized machinery and, specifically, cautions when buying used equipment. In this second and final part we offer some guidelines on sizing equipment for gunsmithing, examine the import market and consider “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.

### What Size Is Right?

In terms of lathe size, the key break point is related to the need to do rifle

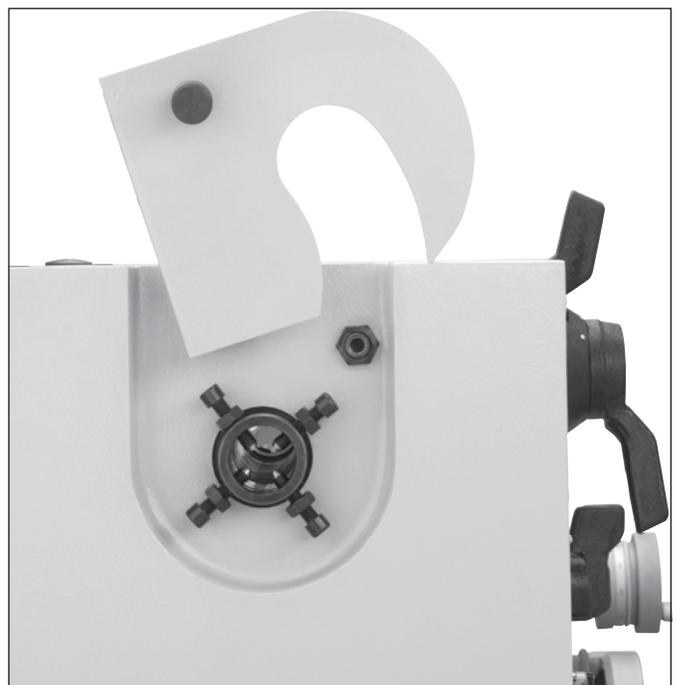
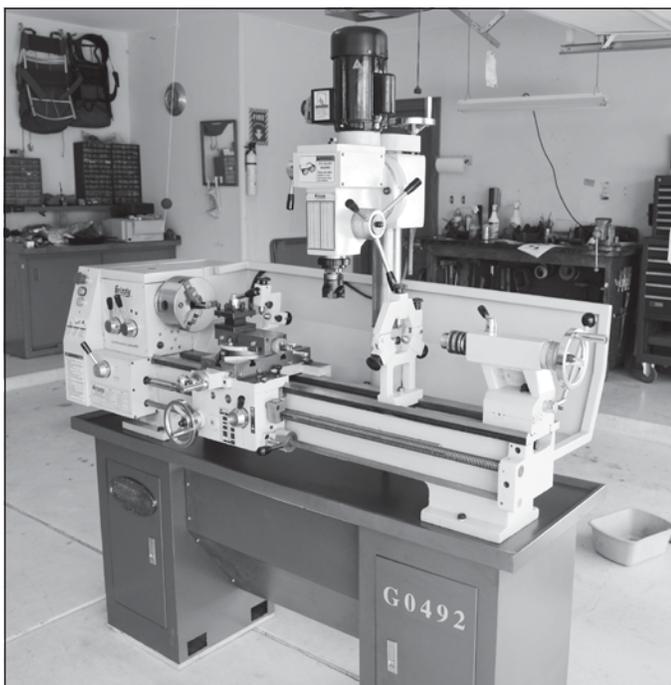
barrel work. Walter Howe in *Professional Gunsmithing: A Textbook on the Repair and Alteration of Firearms* states, “An ideal size for the gunsmith would seem to be one that can accommodate at least 36 inches between centers and having an 9-inch swing. It should be equipped for thread cutting and have automatic cross feed. Also, where it is anticipated that much barrel work (chambering) is to be done, the headstock spindle should have a hole in it that is at least 1 $\frac{1}{2}$  inches in diameter, so that a ‘rough’ barrel blank can be held close to the chuck face for chambering and the like.”

Charles Edward Chapel in the *Complete Guide to Gunsmithing* recommends, “...a swing of 10 inches.

It is 37 inches between centers . . . The headstock has a  $\frac{3}{4}$ -inch spindle.” Roy F. Dunlap in *Gunsmithing* states, “The gun shop lathe should be large enough to handle a bolt-action rifle — receiver with a 26-inch barrel — and should have a 1 $\frac{1}{4}$ -inch hole through the head, so any barrel or blank can be put through for cutting off and crowning. Bed should be not less than 36 inches, although swing does not need to be large.” W. F. Vickery in *Advanced Gunsmithing* states, “A lathe of large swing is not required for the gunsmith’s work but it should have length enough between centers to handle the longest barrel ordinarily used. Another thing in a lathe that is of great advantage is a

*Below left:* The author purchased a new combination lathe/mill unit because of insufficient space for separate units. This Model G0492 Grizzly 12" X 36" has the size and capacity to do the range of projects envisioned.

*Below right:* Grizzly offers two different lathes specifically designed for gunsmithing with unusually large spindle bores and outboard spindle spider supports (pictured). The modestly priced Grizzly G4003G gunsmith lathe plus a table mill was an alternative, if space were available, but the size and flexibility of the X & Y power feed on the combination unit was the deciding factor.





hole through the head spindle large enough to take the largest diameter barrel, which is about 1¼" usually." Visit the specification pages on the website of any barrel maker such as Douglas Barrels, Inc. of Charleston, West Virginia and it becomes very clear why these authors chose these overall dimensions for rifle work.

In terms of mills for gunsmithing, there is more flexibility. Walter Howe in *Professional Gunsmithing* believed that, "The best type of miller for the gunsmith who needs such a machine in order to do his specialty work, is one of the table models equipped with power longitudinal feed. There is very little milling work that the gunsmith will be

**Above left and right:** Chinese mills and lathes have improved dramatically over the past decade and well-known brands such as Grizzly, Jet, Shopmaster, and Smithy have their own on-site quality inspectors. Pictured is runout being measured on the headstock (left) and mill spindle (right) on a Grizzly combination unit.

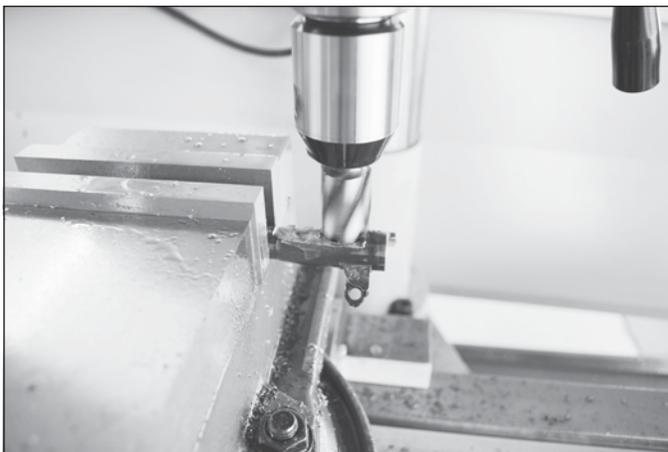
called upon to do that cannot be done on one of these small machines."

Patrick Sweeney in *Gunsmithing Pistols & Revolvers* states, "When considering the purchase of [a mill or a lathe], you should look carefully at what you plan to do, how much it will

cost, and how often you plan to do it. The two competing temptations when buying either a mill or a lathe is to get one that is either too small, or get one that is too large."

Yes, size really matters and it is worthy of well thought-out consider-

**Below left and right:** .45 auto barrel is being machined (left) for an Arizona police department crime lab as a visual aid explaining rifling to jurists. Gun cutaways are useful for training or sales. When making machinery purchases opt for maximum flexibility because you never know what unusual projects might come up.





ation, especially when it comes to your budget. Even with all of the preceding comments by authors of classic gunsmithing books, the final choice will depend on what you anticipate doing now and in the future, along with recognizing that occasional non-gunsmithing projects may come up. Once done with the size question you will next need to consider whether to buy new or used. In Part 1 of this series we discussed the care that needs to be exercised when buying used equipment. Used equipment can offer the greatest value for you money but only if you are cautious and buy right. Next we examine the new equipment market.

### Import Market

For those of you that need something sooner (like last week) and without the associated risks of used equipment, new equipment is the way to go. As stated in Part One, there are obvious choices if you have an unlimited budget and prefer to purchase American or European equipment. Korean and Taiwanese imports were first on the scene to offer units at a fraction of the cost and machinery from mainland China started to appear soon thereafter. For example, advertisements for Jet and Grizzly Industrial machinery frequently appear in gun magazines. The former distributes lathes made

***Above left:** Total up the basic accessories that will be needed for gunsmithing. For new units there can be a wide variety included in the base cost. Items such as live centers, vices, and lathe dogs are universally available but attachments such as face plates, steady and moving rests, threading gears, and chucks can be specific to the unit and expensive or difficult to locate for used equipment.*

***Above right:** Machine equipment is just the price of entry to gunsmithing. You can buy entire sets of items such as end mill holders, collets, etc., on web-based auctions such as eBay. On rare occasions at garage or estate sales you can find entire sets of precision tools and gauges complete with a mechanic's chest.*

in China and mills produced in Taiwan and the latter distributes both lathes and mills manufactured in mainland China.

When I was a kid in the 1950s, "Made in Japan" was synonymous with poor quality. We all recognize today that Japan successfully moved up the product chain from cheap toys to the finest quality automobiles, electronics, and optics. I attended a series of meetings in China in 2008 and listened to business managers discuss their strategies to make the same progression. Judging by my tour of an automotive assembly plant in Xiangtan, China they are far along in the process. The point is that one cannot judge the quality of Asian imports today by evaluations and judgments made as few as five years ago. Keep this in mind when conducting Internet searches looking for customer

evaluations. I have seen equipment reviews as old as a decade still up on the Internet. A good starting point for more current information is the online forums at [www.machinetools.com/us/forums](http://www.machinetools.com/us/forums). Many gunsmiths agree that the quality of Chinese imports has improved and should not be a barrier any longer. For example, well-known writer and retired gunsmith Reid Coffield states, "In general, I am pleased with the imported machine tools I have purchased. I think that for the money, I have gotten pretty good value, and the machines have served me well."

That is not to say that there cannot be problems as issues can arise with any brand anywhere in the world. The products of each manufacturer need to be individually evaluated. The major brand-name distributors such as Grizzly have their own quality control

(QC) inspectors on their payroll who are at the factory during the assembly process and use a detailed checklist of tests to run on every machine on the line. They also inspect subcomponents before they are even installed. Both Smithy and Shopmaster (more about these combination units later) have similar QC procedures, including detailed specifications for alignment and runout tolerance limits for key areas. In checking the runout on the new Grizzly unit I bought I found it to be within a few one ten-thousandth of an inch from specification and the slight difference was probably due to my own measuring technique.

Aside from the QC inspections and warranty agreements on new equipment, some companies will run Internet or advertised specials which might include free shipping or the addition of useful accessories at no extra charge. Units can be bought with single-phase 240-volt motors so the power issue discussed earlier in Part One is not an issue. If you have made the decision to buy you should also get out the tape measure and make sure that you have room in the shop. Having both a full-sized mill and a lathe capable of doing rifle barrel work requires a surprisingly large amount of floor space considering the access room necessary around the units. Distributors can supply these dimensions.

### Making A Choice

Deciding which new unit to buy can be influenced by a host of different factors that are really a matter of personal preference. As stated, the major brands generally have detailed QC procedures. The ones that have been around for years advertise in national magazines and have a QC staff that is more likely to be there when you need technical support or warranty work. There are new, inexpensive "no-name brands" that can be found on the Internet through sources such as eBay but you get what you pay for and, for my money, I'd rather go with a known entity.

As large as my shop is I did not want to take up the remaining space with separate units. Budget was also a consideration since I needed the flexibility of having both units but could not afford two full-sized machines. I found that a combination unit is, at least for my requirements, a viable choice. These are attractive since they can be obtained new with a guarantee from reputable distributors, are reasonably priced and are large enough to do barrel work as the headstock bore ID is greater than one inch and bed length is a minimum of 32 inches. Grizzly, Shopmaster, and Smithy sell units that meet these requirements and also have a wide range of accessories. Smaller combination units such as the Prazi Powerturn and Central Machinery's "multipurpose" units are also available but they have relatively short beds, small spindle bores, 120-volt motors and do not include as many options and accessories. They may be fine for handgun work but I wanted something approaching an industrial-sized unit since I envisioned doing other types of machining besides gunsmithing.

As the comparison table of these three units indicates, each machine has strengths and weaknesses. For example, two of the units, especially the Shopmaster Patriot with its three-axis power feed, state that it is possible to add computer numerical controlled (CNC) automation. In today's commercial machining environment, CNC has become almost mandatory and as hardware and software prices continue to drop they are within the reach of gunsmiths and even home hobbyists. If this option is in your future plans consider that separate machines will require buying two systems. Likewise with digital readout systems, flood coolants, benches, and so on. In this field, the 3-in-1 machine offers considerable advantages since a single option can be configured to function on both the lathe and mill.

I chose a combination unit knowing full well that dedicated, separate units are generally the best option.

## American Gunsmithing Association Enrollment Services

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Return this coupon (or a photocopy) to:

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P.O. Box 420234

Palm Coast, FL 32142-0234

customer\_service@belvoir.com

Internet chat rooms are littered with posts droning on this point endlessly. I was particularly interested in the lathes Grizzly offers that are made specifically for gunsmithing such as the G4003G and G0709 models that have unusually large spindle bore diameters and outboard spindle spider supports. I also wanted a mill and was limited in both floor and tabletop space. As you get further into doing your homework on making these purchases you will soon realize that numerous individual preferences are involved. No single unit can necessarily satisfy every need.

I purchased a Grizzly combination unit, specifically the G0492, because the mill is mounted in the center of the bed instead of directly over the headstock, it has a large bore diameter and a good bed length. This unit included a table with cabinets, splash shield and other accessories such as a 4-jaw chuck, faceplate, steady and moving rests, and free shipping. For all of these distributors there are Internet specials to be had at any time and shipping and accessories promotions can change. I happened to catch Grizzly at a particularly good time.

While I chose the Grizzly, I cannot strongly recommend one of these three units over the other as they are all good machines. Again, you have to consider your long-term needs. For example, Patrick Sweeney in the previously mentioned *Gunsmithing Pistols & Revolvers* states, “[The Smithy 1220 XL with a 20" distance between centers] is large enough to handle any handgun milling need. It is also a lathe. The mill head can be used as a drill press. Three tools on one, for less cost and less floor space than three separate tools.” In essence, I was using the same logic but applying it to rifle work.

What I can say with certainty about new equipment is that when problems arise it is really nice to be

dealing with reputable companies such as these. For example, there was some minor shipping damage on my unit and Grizzly immediately took care of it for free. They were also there to answer my questions during start-up. Yes, you can save money by taking chances with the no-name warehouse brands, but when problems arise you may be muttering to yourself instead of talking to a technician to correct the problem.

One of the reasons for including such a detailed listing of specifications is to provide readers with a shopping list of factors to consider no matter what type of unit is being bought — new or used, mill or lathe. Speaking of shopping lists, one should also consider the cost of basic accessories such as chucks, rests and tool holders. It is important to estimate and total up the costs of all of these in order to do a fair comparison since both new and used equipment can come with a range of various accessories and tooling included in the base cost.

The need to investigate the availability and cost of accessories is critical when buying used equipment no longer manufactured because compatible accessories might be expensive or difficult to find. In general, one can find repair parts and accessories for major brands such as Bridgeport and South Bend, but buying a fifty-year-old obscure brand of machine can present some real difficulties. For example, if you frequently need to center odd-shaped parts on your lathe and it is impossible to buy a compatible, independent 4-jaw chuck, you are out of luck. That bargain used lathe is now a liability.

The occasional need for specialized tooling is always a factor no matter which type of unit(s) you own. Tooling is readily available through distributors such as Brownells (500+ page catalog, including specialized gunsmithing tooling), Enco (1,100+ page master

catalog), Grizzly Industrial (600+ page catalog), and MSC Industrial Supply (2,000+ page metalworking and 4370+ page master catalogs). If you are patient and lucky sometimes you can find entire new and used sets of tooling at bargain basement prices on the Internet. If you are particularly lucky you can find mechanic tool chests loaded with top quality tools and gauges at estate or garage sales.

### Vendor contact information

#### Combination Units

Grizzly Industrial  
Bellingham, WA 98229  
grizzly.com  
800/523-4777

Shopmaster  
Las Vegas, NV 89131  
shoptask.com  
800/343-5775

Smithy  
Ann Arbor, MI 48106  
smithy.com  
800/476-4849

#### Phase Converters

American Rotary (Gentec)  
Port Washington, WI 53074  
americanrotary.com  
888/743-6832

#### Equipment Rebuilding

Gallery of Machines  
Marathon, NY 13803  
galleryofmachines.com  
607/849-6028

#### Tooling

MSC Industrial Supply  
Melville, NY 11747  
mscdirect.com (Master Catalog)  
800/645-7270  
mscmetalworking.com  
800/521-9520

Enco  
Fernley, NV 89408  
use-enco.com  
800/873-3626