

Buying a Used Shopsmith Mark V - Revised and Annotated 2015

A checklist to help you find the bargains and avoid the basket cases

This revised document is **based on a 'text only' [Original Document](#) found at Shopsmith Academy.**

That document was not credited specifically by an author within the text. I believe it is written by Nick Engler, and perhaps other Shopsmith staff. Hold the Ctrl Key down while clicking on the **Original Document** link above to access it.

Photos were added *with their links* to help illustrate the topics covered for even the less experienced buyers. Added text appears in blue or even red to keep those separate from the original author(s) text which remains in black.

One point of view is the [Original Document](#) is the brief, and this document with revisions, the expanded version.

Tons of valuable information is available at www.shopsmithacademy.com within the free on-line Sawdust Sessions segments 1 – 24 taped August 11, 2007 through September 13, 2008 and online Video Shop Tips that can help you expand your knowledge, keep you and others safe, and your equipment in top mechanical working order.

Nick Engler's Video Sessions are available there for purchase there in DVD, VBooks etc.

Believe me, I don't come close to knowing it all, and many on the forums know volumes more, and what we collectively don't know, we often find out together as we collaborate. You will find that pattern repeated in threads in the forums.

Shopsmith Academy Woodworking Forums are listed below with links. Topics in Maintenance and Repair are very relevant and important guides to information you need to know, from experienced members all over the country.

[Beginning Woodworking](#)

[General Woodworking](#)

[Woodworking Tool Review](#)

[Maintenance and Repair](#) - As an Example: as of March 2015 it alone had 4028 Topics and thousands of post listings with photographs and links within it alone. - below are two that are so important they were made sticky posts, (always presented at the top of the forum).

[New Owner Information](#) by JPG

[Everything Mark 5 / V - Technical info, documentation, links](#) by mickyd

[Community](#) (Any Topic Someone Wants to Discuss – most anything – yes even controversial topics pop up occasionally)

In this revised document, selected photos are added from submissions within http://www.shopsmith.com/ss_forum/ and other photo sources based on research done to help visually document with what's being presented and help someone even new to it better understand this remarkable machine.

Links created for the photos can take you to the thread from which they came, but not always the page or post in that thread. The forums do not attach a link other than the thread to posts within the thread, so you may have to drill down to find the exact photo, and read about topics that lead to posting it. The file name of the photo has the forum member name and post number reflecting who posted the original photo. *Some of the photos had part labeling added for identification.*

When **you** search for tools, whether used or new, it's useful to keep your true goal in focus. No one buys tools because they want tools – they want what tools can do. You are considering buying a used Mark V because you want to remodel your home, build some new kitchen cabinets, make toys for the grandkids, or pursue some private vision of yourself as a skilled craftsman or creative artisan. Tools, especially good tools, will help you achieve these worthy ambitions and they are an essential ingredient for your eventual success, but they are not the only ingredient or even the most important. What you need first and foremost is the knowledge to use these tools effectively.

This is not just important, it's pivotal – and that's why I've put it first on this checklist.

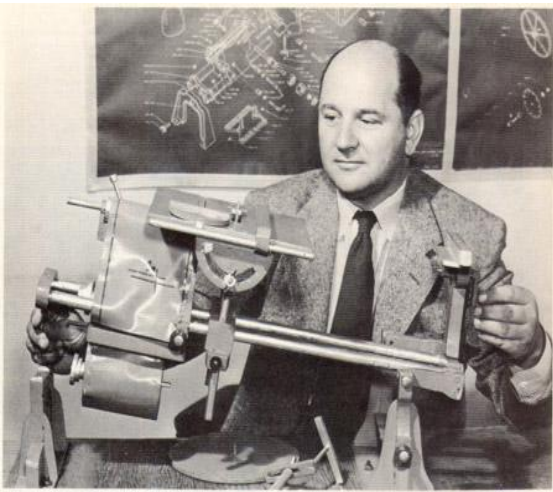
You are considering buying a Mark V because:

- You've heard it's a quality tool.
- It packs a lot of capability into a small space.
- Its unique design allows it to do many things other stand-alone tools can't.
- It's a great tool to learn on if you want to explore woodworking as a potential vocation or avocation.
- It's a decades-old tried-and-true woodworking system.
- The older machines are well-supported, serviceable, and upgradable.

All of this is true, but I suggest you add one more item – education.

Try to find a tool manufacturer that has authored more information about using its tools, or more knowhow about the craft of woodworking. There are none that even come close to Shopsmith.

A little history



The Shopsmith 5-in-1 system was the brainchild of inventor Hans Goldschmidt who organized a company called Magna Engineering just after World War II. They released their first tool in 1947, the Shopsmith 10ER (Model **10**, Experimental, “Revised”, in case you’re wondering). It was well received, and Magna made dozens of improvements of the next 7 years, and in 1954 released the Shopsmith Mark V. Although there were other “Marks” – a Mark II and a Mark VII – the Mark V was the flagship. The design has been manufactured steadily by several companies since Magna, with well over a million sold.

From his initial drawings seen on the wall behind him, he built a half-scale model in his bedroom.

AN INTERVIEW WITH THE INVENTOR OF THE MULTI-FUNCTIONAL SHOPSMITH WOODWORKING SYSTEM

<http://www.shopsmithhandson.com/marapr/goldschmidt.htm>

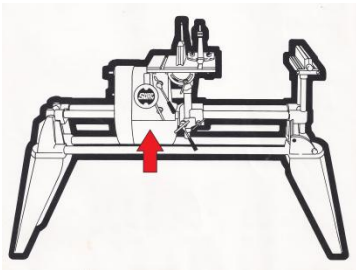
Although newer Shopsmiths look much the same as older ones, the design has not remained unchanged. There have been dozens of improvements made over the years, and you need to be aware of at least the most important of these as you shop for a used machine. Yes, you can update a 1954 Mark V to have all the same improvements and capabilities as one made this year. Yes, there are service parts and service people who can help you make the most hopeless basket case useful and productive once again, but it will cost you. And it may cost you many times the purchase price to restore an older machine that has not been well-cared for. So it's worth your while to take a good look under the hood and consider all the hidden expenses before you buy a used machine.

Breaking it down

Because it's designed to do more than one operation, the Mark V is more complex than most consumer power tools. It helps to break the machine down into its component systems and consider each sub-system on its own, part by part. There are four of these sub-systems:

- **Headstock**, consisting of the motor, speed changer, arbors, and movable quill.
- **Main Table**, consisting of the table, trunnions, carriage, and table-raising mechanism.
- **Frame**, consisting of legs, tubes, headrest, and pivoting base.
- **Accessories**, consisting of parts for each of the five functions – sawing, drilling, boring, turning, and sanding as well as some accessories for extra support, safety, maintenance, and setup.

Headstock



An important component definition: *The term Sheave or Pulley is often used by sailors, crane operators, mechanics, machinists, and others interchangeably.*

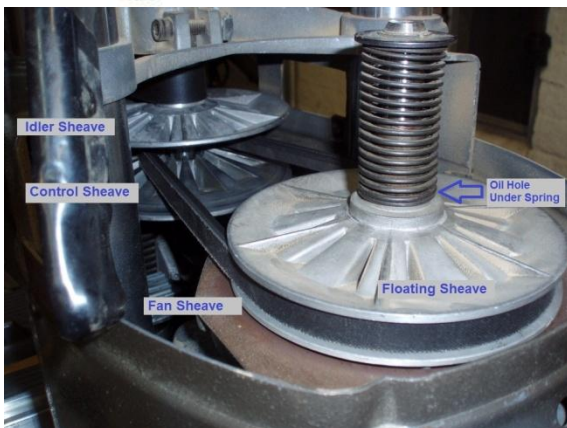
For reference concerning components in a Shopsmith headstock: split sheave sets form a single variable diameter pulley. Shopsmith calls them sheaves (half-pulleys), and each sheave half may be orderable separately as a replacement part.

This makes the identification of each half of the sheave necessary either to describe each side's function within each assembly for servicing or for ordering replacement parts.



The headstock contains an electrical **motor** with a non-standard mount and shaft. You cannot go out and buy one of these off the shelf, so you want to be sure the one you get is in good shape.

They can generally be repaired and rebuilt and there are forum posts on how to do that, as well as a host of folks who can do it for you if needed.



On the shaft of that motor are two floating **sheaves** (half-pulleys) and a **V-belt** that turns an **idler shaft** with two more floating sheaves. The idler shaft turns the **drive shaft** at the top of the headstock via a **flat belt**.

High Speed Sheave Positions - Photo credits - Dusty post #174149

This spring is under pressure and you will need to employ a method to compress it, remove the retaining ring and slowly release spring should you need to service the sheaves or rebuild the motor. Dusty's post was related to replacing the belt, without removing the spring.

Shopsmith document [Mark V Shopsmith Motor Replacement](#) describes such a process leaving one hand free to accommodate removing spring while the motor is in the Headstock in drill press position as shown in Dusty's photo.

Other forum member posts describe a variety of other ways to remove and reinstall the spring safely even with the motor out of the machine. Different motors have slightly different appearances but the general process is the same.

You don't have to disassemble it just to oil it as part of routine maintenance. You can manually pull the spring away from the sheave often by hand or with a screwdriver, exposing the oil hole to add a few drops of oil in the hole.



Low Speed Sheave Positions - Photo credits - Dusty post #174149

The oil hole on the Floating Sheave is inaccessible with the sheaves in this position as the spring cannot be pulled further back from the sheave to expose it.

Labels were added to the original photos to identify components.

The belt on top of the Idler Sheave in the background is the **flat belt** that turns the **drive shaft** as mentioned in the text. It can be a current Poly V-Belt or if it was made 1954-61, a Gilmer Belt (toothed).



Speed Changer set to Fast – Photo credits - Nick Engler post #1321

As you turn the **speed changer**, the sheaves on one shaft (**Control Sheave on the Idler Shaft**) get closer together and the sheaves on the other (**Motor's Floating Sheave on Motor Shaft**) get further apart.

This changes the speeds at which all three of the power take-offs or **arbors** turn – one at the end of the quill at the front of the headstock and two at the back. The **quill** extends and retracts from the headstock, like the quill of a drill press. Additionally, there is a **switch** to turn the motor off and on, and a **headstock lock** to secure it in position on the tubular frame.



Speed Changer Mechanism – Photo credits - Nick Engler post #1321

After removing the control dial with an Allen wrench as shown in the photo above, Nick exposed the mechanism that drives a worm gear in the Headstock that moves the Quadrant. The Quadrant is a 'Pork Chop' shaped threaded arm that moves the Control Sheave described previously which sets the speed of the machine.

You should never rotate the speed control unless the motor is running, or unless you are rotating the Quill by hand as it will damage parts inside the Headstock when the belts and sheaves aren't rotating.

If you take time to attach the Sanding Disk, or even a smaller turning plate to the Quill etc., you can usually spin the quill fairly easily which rotates all the Sheaves and belts, while you simultaneously manually rotate the speed control dial.

If you can't rotate the quill by hand with the machine off, something needs attention already, and turning the unit on will likely make that condition worse. You will use this manual rotation technique to gain access to oil holes as part of routine maintenance, so it's something you need to know and master early on.

Check the speed setting before you turn on the machine if you have anything attached to the Quill or output shafts or not. Everything can safely rotate at the slow speed, but not everything is rated for higher speed. Stay alert and safe.



Quadrant – Photo credits - Nick Engler post #1321

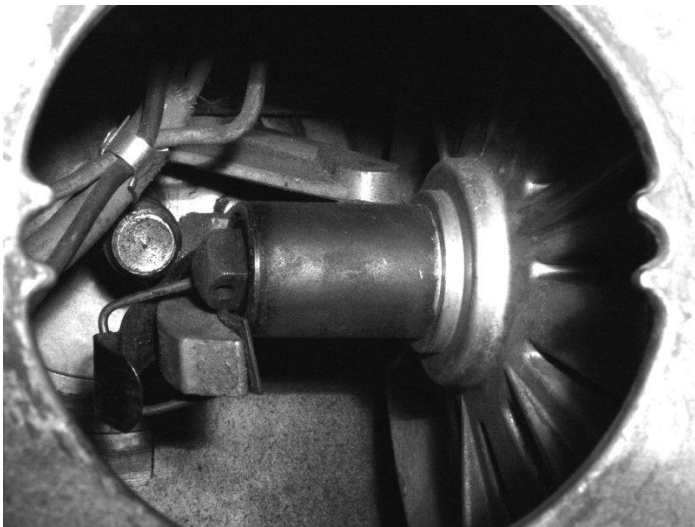
You can see the Worm Gear that is rotated by the Speed Control Dial on the front of the Headstock connects to the Quadrant (Pork Chop).

As shown, this is in High Speed setting: Idler Sheave on the Right - Control Sheave on the left, separated, setting the 'effective' diameter of the 'variable pulley' to its smallest setting by pulling the Loop secured to the Button protruding from the Control Sheave. *The Button face at the Quadrant and visible Oil Hole will need routine lubrication.*

Imagine if you will, now rotating the speed control dial without the belt rotating. Quadrant would fail to move the now stationary sheaves. Speed Control mechanism's gearing provides extensive mechanical advantage, continuing to force the Worm Gear to try to move the Quadrant right, along the plane of the white arrows.

Even though the Quadrant is exerting tremendous force, there is no place for the Drive Belt to move as the Floating Sheave and Fan Sheave on the motor below are fully together with the Drive belt on the outermost radius of the two sheaves as seen previously in Dusty's photos. The Drive Belt is fully tensioned at all times and it is not going to stretch.

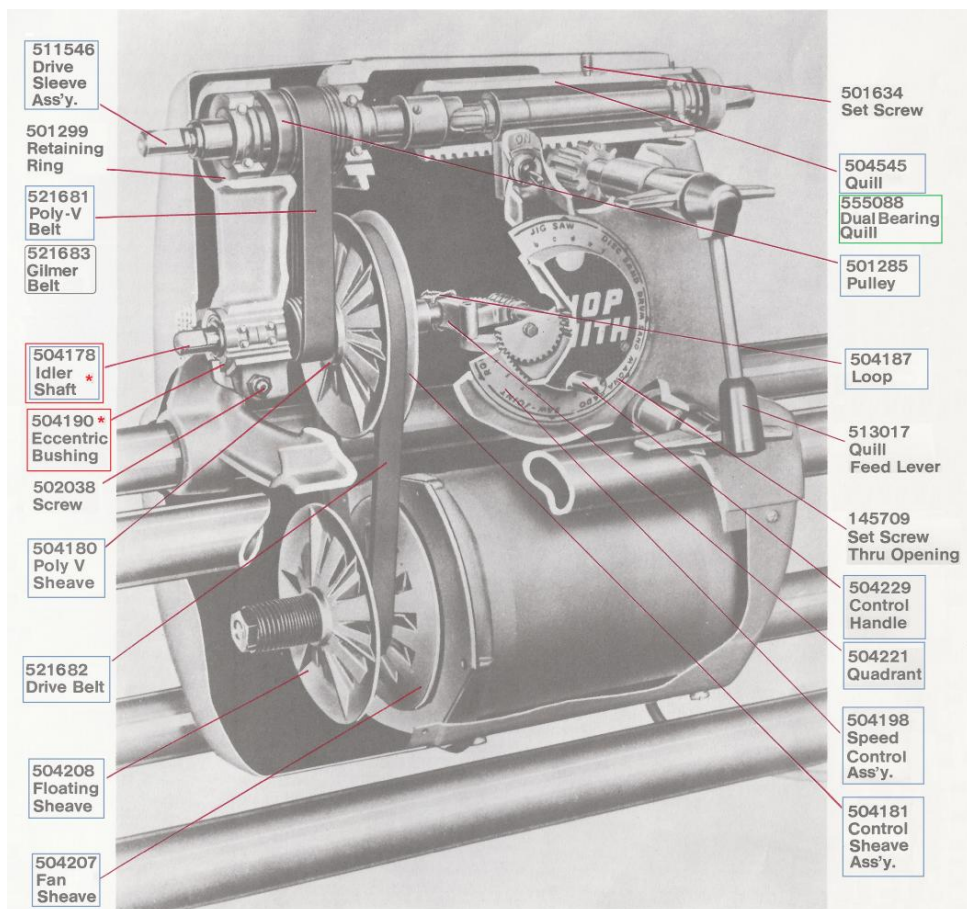
Trashed Speed Control - Photo credits 'mickyd' – post #31109



Control Sheave and Quadrant have to be replaced at a minimum. It's also a good idea to reposition the electrical wires that are now touching the mechanism. They shouldn't be loose and able to fall into this area at all, but that's not caused by this Quadrant being damaged.

This was almost certainly preventable had there been consistent manual rotation of the Quill assembly by hand when moving the speed dial with the motor off. Damage was likely progressive and occurred over repeated misuse of the speed control when the sheaves were not turning. Damage can also occur in the gearing and teeth be stripped off on the front side of the speed control, requiring that to be serviced as well.

This photo was taken by 'mickyd' through the access port behind the name plate on the back of this 1955 machine. Mark V machines made in 1955 and afterward have this inspection port opening. (More on that later)



Before we get much deeper into the specifics of what things to check that is discussed in the text-only version, let's visually identify a bit more of the machine in detail to help you understand what you are looking at before you buy it. It's more difficult to know what you are looking at, without having seen it before. Let's fix that by looking inside.

This Cut-Away view of the Headstock provides a visual reference to the parts and their relationship. 2015 part numbers included for reference.

As illustrated, the Control Sheave is in 'almost' the slowest speed setting.

With a new Drive Belt, not worn down as some will be, the surface of that belt will rest a bit nearer the edge of the Idler / Control Sheaves.

That's the slow setting reference point, and a position you will set-up when adjusting speed control.

Review the spring on the Floating Sheave. How do you compress the spring to access the oil hole again? It's not possible with the spring compressed (in slow), and why you will need those other skills to allow the speed dial to safely move with motor off, rotating quill by hand.

Whether you are left handed or right handed, you can mount the sanding disk on either end to manually rotate the Quill, Sheaves and Belts when needed. You would turn it off in high, and use the manual procedure to put it back.



The Poly-V Drive Sleeve Assembly drives the Shaft Assembly inside the Quill. The Poly-V Drive compatible Quills differ from those of earlier Gilmer Drive Sleeve Assembly Quills and are not interchangeable. *Photo credit: eBay*



The Poly-V Drive Sleeve Assembly mounted in the Headstock viewed with the Belt Cover removed. This has been the standard drive type since 1960.

Photo credit – 'bobgroh' post #39084

Mounting the Sanding Disk and rotating a machine you are considering buying when it is powered off (as discussed above) is an excellent way to 'feel' how (or even if) the mechanisms are working together.

For existing owners, having a baseline 'muscle memory' on how your own properly maintained and lubricated Shopsmith feels and sounds at home can give you a good reference point to begin inspecting one you are considering buying.



The earlier Gilmer Drive Sleeve Assembly (contains an internal clutch assembly)
Photo credit eBay



The earlier Gilmer Drive Sleeve Assembly mounted in the Headstock viewed with the Belt Cover removed. An anomaly on this photo may first escape you. 1960 Goldie Headstock introduced the Poly-V Belt system. The Gray Mark V with the Gilmer Drive never came that way from the factory. This headstock was actually repainted by Jerry. A Gilmer Drive in a newer Headstock could also be done. Grey doesn't mean newer any more than Green or Gold always mean older. Tribute re-painting occurs on Headstocks that were replaced, or an original Greenie or Goldie vintage unit may be upgraded internally with new parts. *Photo credit Jerry in 'Shopsmith Mark V Restoration blog' at Lumberjocks.com*



Clutch above is really a collection of edited and combined photos. *Source Photo credits 'mickyd' – post #32872*

The earlier Gilmer Drive Sleeve Assembly above has an internal mechanism (clutch assembly) designed to provide consistent drive to the Quill and output shafts for an accessory, but it is designed to slip if the torque required exceeds a pre-set safety threshold.

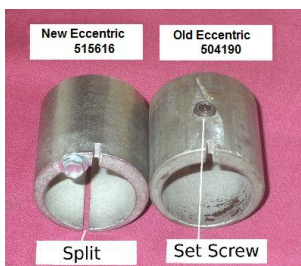
Without proper maintenance and adjustment, any condition such as a saw blade binding could cause the clutch not to disengage and damage internal parts of the Headstock. This occurs as even though output shaft is seized, the Gilmer drive belt continued to drive against it and caused damage. Poly-V replaced these in 1960.

If you refer to the previous cut-away illustration on the left side you will note the Idler Shaft and Eccentric Bushing are framed in red. There is a production change you need to be aware of.

As stated before; the idler shaft turns the **drive shaft** at the top of the headstock via a flat belt.



The idler shaft assembly has been redesigned and uses a different Eccentric Bushing to adjust Belt Tension. The Idler Pulley with the Poly-V drives the shaft by a Key Slot that aligns them on the shaft. The other half of this set is the Control Sheave, discussed previously. Combined, the sheave assembly drives the shaft, with the Control Sheave moving in and out on the shaft to change speed. The two are not interchangeable. If you order the new style and have the old eccentric, it will have to be upgraded as well.



New and Old Eccentric Bushings: With either type, the bushing is rotated using the slit cut in it, to maintain the proper belt tension on the Poly-V Belt.

Photo Credits: Shopsmith Inc.

2015 Part numbers were added

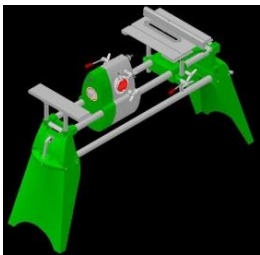
Used units may have been modified or upgraded by the owners through the years. Spotting those that have been abused, neglected or worn is something you can visually learn to do. They all probably can be fixed, yet condition affects present value and what you should be willing to spend for one.

Now what vintages are the machines are actually out there?



At left is the 1947 original basic machine profile known as 10E / 10ER that predates the Mark V Profile which would begin to be made by Magna America in the 1953-54 era.

Magna became one of the best success stories of the era. The first big buyer was Montgomery Ward which ordered 250 machines for their West Coast stores for Christmas of 1947. Response was so great that the department store chain made it a stocked item, nationwide. Sales reached \$3 million in 1948, and then doubled to \$6 million by 1951.



The 3D rendering at left reflecting the new 'Greenie' headstock and base profile was done by another forum group member 'magnagreen' in AutoCad last year and is representative of the 1954 'Greenies' produced from 1954 to 1960. The heavier 'A' Headstock without the backside service port opening would become replaced by the lighter casting 'B' Headstock with that service port opening. This profile (opposed to 10E / 10ER) is often referred to as a Shopsmith Mark V (500) model which would have three color schemes over the years: 'Greenies' 1954-60, 'Goldies' and 1960-63 Gray Crinkle 1963-64. *Drawing credit 'magnagreen' – post #160112*



1958 to 1960 Mark II (5-in-1) Montgomery Ward offered their own version of this popular tool, known as a (Magna) Mark II which was never manufactured by the later Shopsmith Inc. and sadly, was not made of the same quality as the MARK V. No parts are available for those from Shopsmith, though used parts show up on eBay from time to time. As a courtesy, Shopsmith has acquired some Magna documentation they can provide for under \$10 for someone needing a copy for a Mark II. Others in the forums may have a copy, or perhaps might know where one could be found.



1960 Mark VII (7-in-1 tool) Included a spindle shaper dust collection system. The unit could be tilted in either direction. Plastic racks controlled headstock movement. The Mark V headstock will fit on the Mark VII frame (the plastic rack must be removed). It also has a plastic speed control that tends to melt with extended use. Shopsmith has very few repair parts for these tools left over from when they bought the company in 1972. An information packet, including copies of parts lists, owner's manuals and more are available.

Like almost every other successful product of any kind, there were a series of copy-cat knock-offs being made overseas through the years under a variety of other brand names. They too are out there and show up on eBay. Some who sell them there even do not know the difference and incorrectly say they are 'Shopsmith' when they truly are not. Watch for that and know what you are buying.

1958 The Magna Engineering Company merged with Yuba Consolidated Industries and you will find Magna and Yuba accessories that still work today, or can likely be restored to working order. Many were replicated in Shopsmith branding and continued to be sold. They too have upgrades and improvements though the years.

The next series of photos are all credited to Shopsmith Inc. respectively



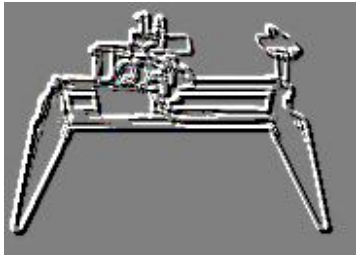
The Greenie Headstock at left (yes it looks a bit blue) had $\frac{3}{4}$ HP motors and used 9" saw blades. The drive mechanism from motor to idler shaft was a V belt as it would remain for decades, but the idler shaft driving the upper output shaft with internal clutch used a Gilmer Belt (similar to a tank track) and toothed splines to power the retractable Quill system that the blade, sanding disk, lathe centers, molding head, shaper and drill chuck all attached to. This would upgrade in 1960 to a Poly-V Belt similar to modern serpentine belt on your car. The upgrade required replacing the Quill, which also has a different configuration.



The 1960 Goldie Headstock introduced the Poly-V Belt system described above, and by 1962 would be upgraded with a 1 $\frac{1}{8}$ HP motor more capable of driving the now 10" sawblades in even the most hard wood. Any previous Mark V system could be upgraded to the more powerful 1 $\frac{1}{8}$ HP motor.



1963-64 the machine profile was now painted a Gray Crinkle Texture finish with a Headstock with all the new features internally previously added to the 'Goldies' Headstocks including the new 1 $\frac{1}{8}$ HP motor. The worktable is still the small version.



1964-72 The Mark V was in the shadows and out of production as Magna America / Yuba Corporation relocated.



1972 -- Shopsmith, Inc. Formed -- Mark V (500) is back in production, with a rougher Gray Splatter Texture.

This is just the beginning of the new beginning. Read about the history of Shopsmith Inc. a new company that really began with a search by someone for a saw blade in 1971. <http://www.shopsmith.com/history.htm>



1984 saw the introduction of the 2 bearing Quill that had bearings both in the front and toward the rear of the metal sleeve housing the main shaft. It provided more rotational stability for drilling, boring or turning large objects on faceplates where the material is held only on the end of the spindle while turning. This run-out only measured in a few thousandths of an inch with one bearing and was reduced even further with two.



1985 Mark V Model 510 was introduced with a 17-1/2 inch x 22 inch Main Table. The new table system also included two floating extension tables along with connecting tubes and telescoping legs to provide over 8 feet of table width. A new larger rip fence with t-tracks for mounting accessories and jigs was also included. Other parts of the upgrade included a see-through upper saw guard (with riving knife and anti-kickback device), lower saw guard with 2-1/2" dust port etc. An upgrade kit for this Table system is available for 500 series models. This is a current production version with a 'C' Headstock pictured



A 505 without the expanded floating tables is a budget version offered of the same machine as an entry level machine that could be upgraded as desired. This is a current production version also with a 'C' Headstock pictured. You are noticing the words 'current production' right?



1991 introduced Headstock revision "C" which housed the new square Red Safety Key Switch.

The change necessitated a square hole in the Headstock where a round hole for a toggle switch had been since the Mark V introduction in 1953 with the 'Greenies' in Headstocks 'A & B'.



1999 saw the introduction of the Mark V Model 520 with Pro Fence System. The Model 520 Pro Fence System features two interchangeable stainless steel scales for direct-reading of rip cut widths plus, twin locking levers, one for the in-feed end of the fence and another for the out-feed end to ensure a positive, precise fence lock-down, even when working with large and / or heavy work pieces. An upgrade kit for the Mark V Model 500, as well as an upgrade kit for the Mark V Model 510, is available to give these advantages to older machines.



2010 Shopsmith Mark 7 Headstock would change significantly, but not everything as you can see. Headstock internal changes were so significant and new features so prevalent, the base code model number after 57 years finally changed from Mark V (1953) to Mark 7 (2010). Yes, you can replace or upgrade your existing headstock, or have Shopsmith or even others to do it for you.



The Shopsmith Mark 7 adds two additional functions (shaping and routing) to become a 7 function machine and features an electronic speed-change mechanism making it one of the most revolutionary woodworking power tools available today.



The Shopsmith Mark 7 is powered by the Shopsmith PowerPro Headstock. The PowerPro's DVR (Digital Variable Reluctance) motor features: More Power (1-3/4 hp at 120V and 2 hp at 240V); 120V or 240V operation without any adjustments beyond switching the plug on the power cord; Reduced energy usage and emissions over conventional motors; Dual direction capability; Easy-to-use touchpad controls; Quieter operation; Reduced maintenance... and yes you can upgrade older units.



In addition to existing functions, the Mark 7 adds Double-Tilt to bring an under-table option to its Shaping and Routing capabilities, and yes, that is even available as an upgrade for older machines.



Now you have a visual history to the base machine headstock, and you can see the lineage and family resemblances throughout.

So what's the deal with all the upgraded parts removed? They also are re-useable and coupled with a few dollars here and there can build or restore a separate and quite useful, second machine.

Hand-Me-Down-Parts never looked so good. Some of those parts are showing up on eBay as well.

Let's get back to the original checklist

- The **Number One Thing** to remember **is** when looking over a used Shopsmith is; **don't turn the speed changer unless the motor is running**. If the seller adheres to the standard "you break it; you bought it" policy, you might find yourself the proud owner of a used Shopsmith in need of expensive repairs.
- Mark V's made before 1962 (Serial No. 37143) have **3/4 horsepower** motors; those made afterwards have **1-1/8 horsepower**. The extra oomph makes a big difference. Older machines bog down easier. You can install the more powerful motor, but they are costly.
- Prior to 1962 (Serial No. 37143), early headstocks used a toothed "**Gilmer**" drive belt between the idler and drive shafts. These are less durable **than** the newer "**Poly-V**" belts. They are also less forgiving. The poly-V belts will slip if there is some event that brings the drive train to a sudden halt; the Gilmer belts will not and internal parts may be damaged as a result.
- Early headstocks made in 1954 and 1955 had **no access hole** (covered by a Shopsmith logo) on the side of the headstock; making it extremely difficult to lubricate the interior parts of the speed changer and clean the teeth of the quill. You can have these holes machined, but that's another expense you may not want to shell out.

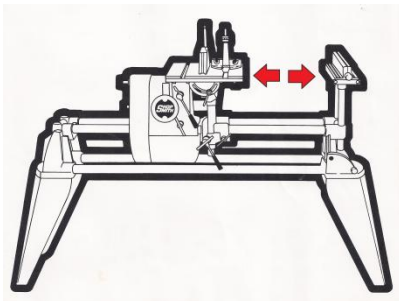
- Headstock made after 1984 (Serial No.190000) have a **two-bearing quill**. These run smoother and have one-fifth the “run-out” as the older single-bearing quills, making it much easier to be accurate when drilling. (Or turning Bowls)
- With 1988, Shopsmith began using the **date of manufacture** as the serial number – mm/dd/yyyy. Knowing that makes it easier to know the true age of a machine.



The earlier machines vent cover plates had the serial number for the machines stamped in them. They were secured with two screws and easily swapped accidentally or even purposefully.

- In 1991 (Serial No. 01011991), Shopsmith introduced a new headstock with a **red safety switch**, replacing the older **toggle switch**.
- Check that the speed changer and the sheaves move easily and are not frozen. Machines that have been mishandled by people who don't know enough not to turn the speed changer if the motor isn't running may have problems you don't want to deal with. Those that have not been properly lubricated or have been stored for a long time may have a jammed drive train. Remove the cover at the back of the machine, turn on the motor, and run the speed changer up and down several times while watching the movement of the sheaves.
- Check that the quill extends easily and then retracts with its own spring tension.
- Check that the headstock locks are not worn. Tighten them ¼ turn past snug, then loosen them and try to move the headstock. If you hear the locks “pop” when you loosen them, they are probably worn and need **to be** replaced. If the headstock won't move until you struggle with it, the locks and possibly the tubes need some careful maintenance.

Main Table



- The table has two **miter gauge slots**, one on each side of the **table insert**, where the saw blade and other cutters poke up above the table. The table tilts through 135 degrees (90 degrees left, 45 degrees right), pivoting on a **table tie bar** supported by two table **posts**. [There is an Extension Table also shown.](#)

- One or two **trunnions** and the table tilt lock secure the table at the desired angle. Racks of teeth in the table support posts and two pinions raise and lower the table in the **carriage**. The **carriage lock** secures the carriage in

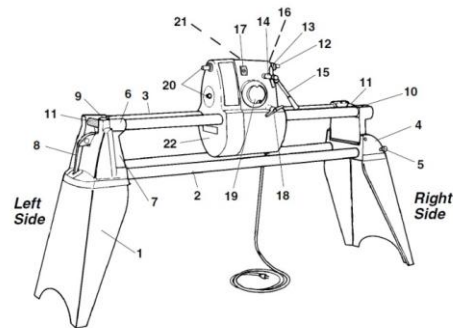
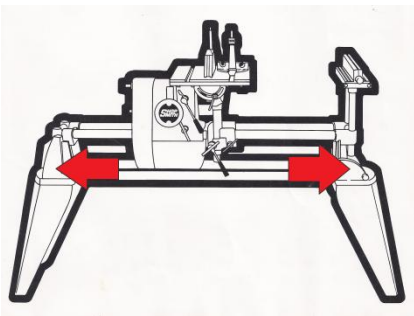
position on the frame.

- Prior to 1985 (Serial No. 196119), the Shopsmith Mark V had but one model. In 1985, Shopsmith introduced the Model 510 with a much **larger table** (171/2" x 22") and **two trunnions** (one in the front, one at the back). Not only did this provide more support surface, the two-trunnion system was much more stable when the table was locked at a specific angle. The older configuration with the single trunnion and a smaller table was designated the Model 500.

[The new Blade Cover for the 510 will not fit a 500 because the Table Support Tubes are closer together and the spacing in the Carriage it mounts in narrower to accommodate the smaller 500 Table Support Tube spacing.](#)

- With the introduction of the Model 510 in 1985, Shopsmith began to cut **T-slots** in the tables rather than standard miter gauge grooves. They also added T-slots to the surfaces of the fence. This helped with the handling of large work pieces and made it possible to mount various jigs and fixtures to the table or fence.
- The Model 510 also used a different shape for the **table inserts**. The design made it easier to mount and dismount the upper saw guard.
- In 1999 (Serial No. 01011999), Shopsmith introduced the Model 520 with a larger and more stable **“Pro-Fence” system** and more T-slots in the fence for increased capabilities.
- Both the Model 510 and 520 offered the possibility of add **floating extension tables** between the main table and the auxiliary table (a standard accessory).
- Check that the table tilts easily and locks securely in place and any angle. If the table binds badly when you are tilting it, the tie bar may be bent.
- Check that the table can be raised and lowered easily and locks at the desired height. Difficulty changing the table height may also indicate a bent tiebar, as well as worn pinions or a bugged rack.
- Check that the carriage slides easily on the way tubes. As check that the locks are not worn – this is done in the same manner as testing the headstock locks (see above).

Frame



- The Mark V is supported on two metal **legs** [1]. The left leg (as you face the speed changer dial and power switch) supports the **headrest** [7]; right leg supports the **base** [4].
- The base [4] and the headrest [7] are joined by two **bench tubes** [2].
- Two **way tubes** [3] run between the pivoting section of the base [4] and a **way tube tie bar** [6].
- The tie bar rests in the headrest and is secured by the **headrest lock** [8] when all four tubes are horizontal.
- When the way tubes pivot to a vertical position, the arm lock **knob** [5] secures them.
- There have been very few improvements to the basic frame over the years; the old design is pretty hard to beat.

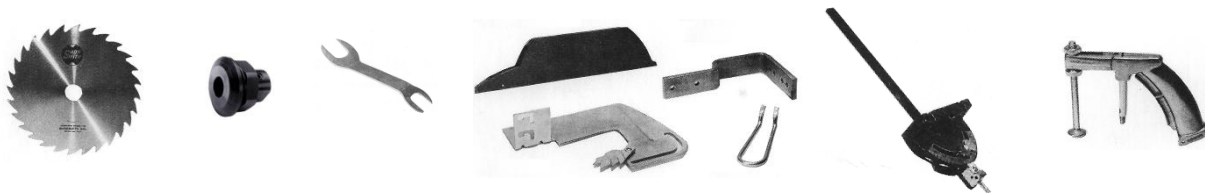
However, there are a few things:

- Prior to 1973 (Serial No. 1001), the way tubes and bench tubes has extremely **thick walls**. Only the way tubes were **plated**; the bench tubes were **painted**.
- Beginning in 1973, all four tubes were plated and had **thinner walls**.
- The frame has been painted several different colors over the years.
 - 1953 to 1960 machines were painted a two-tone **green**. These are affectionately known as “greenies.”
 - 1960 to 1963 saw a two-tone **brown** and are known as “goldies.”
 - 1963 to 1967 machines were painted a **smooth gray**. Same with 1973 to 1984 machines.
 - From 1984 on, the Mark Vs have been painted a **rough gray**.
- Check the surface condition of the way tubes. If the headstock or the carriage locks have ever been over tightened, the surfaces will be **dented**. Small dents probably won’t affect the motion of the headstock and carriage; large ones will.
- Also look for **corrosion** on the way tubes, especially rust pits. Pitted surfaces may also interfere with the movement of the headstock and carriage.
- Check the **bolts** that hold the legs to the headrest and base. These occasionally vibrate loose. On older machines, you are likely to find bolts missing or an odd assortment of bolts.
- Check that the arm lock [knob \[5\]](#) is in place. This is sometimes removed and goes AWOL.

Accessories [Photos added generally are for the Base Model 500](#)

Here, the most important question is, “Does the machine come with all the accessories it once had?” followed by, “Which ones are missing?”

- **Sawing Accessories** – Mark V generally came with a combination saw blade, saw arbor, arbor wrench, lower saw guard, upper saw guard, miter gauge, and miter gauge hold-down.

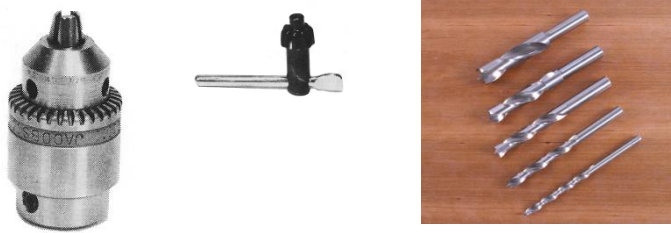


- **Sanding Accessories** – There should be at least one metal sanding disc. Prior to 1967, these were made of cast aluminum; after 1973, steel. It’s probably too much to hope for that these will be many self-adhesive abrasive discs.

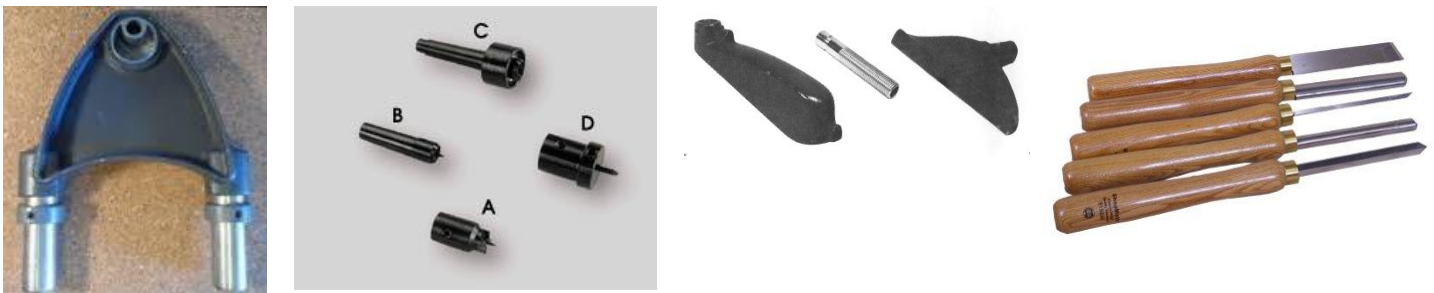


[Note: the arbor \(shaft that attaches it to the Quill\) There are short ones and longer ones based on the Table type and configuration. The earlier \(smaller\) 500 tables could not use the sanding disc inserted in the Table insert. The later ones with larger surface area could, as the inserts were larger. The arbor length was modified to allow you to use it in either position.](#)

- **Drilling/Boring Accessories** – The Mark V comes with a chuck and a chuck key. Some also came with a basic set of brad-point bits.



- **Turning Accessories** – Look for a tailstock, live center [C], drive center [A], tool rest, and two stop collars (to help position the tailstock in the base). Some machines may have come with a basic set of lathe chisels.



- **Support Accessory** – The machine should come with one extension table. Note: on the Model 520 (introduced in 1991), the width of these tables doubled (as pictured). All would have also come with a Rip Fence that varies by model.



- **Setup Accessories** – A long 5/32" Allen wrench and several shorter Allen wrenches (4 to 6 wrenches), depending on the model and when the machine was made.



- **Safety Accessories** – In 1973, Mark Vs include safety goggles. 1984, safety equipment was expanded to include a push stick, fence straddler, featherboard, and push block.



Scratch Resistant Safety Goggles

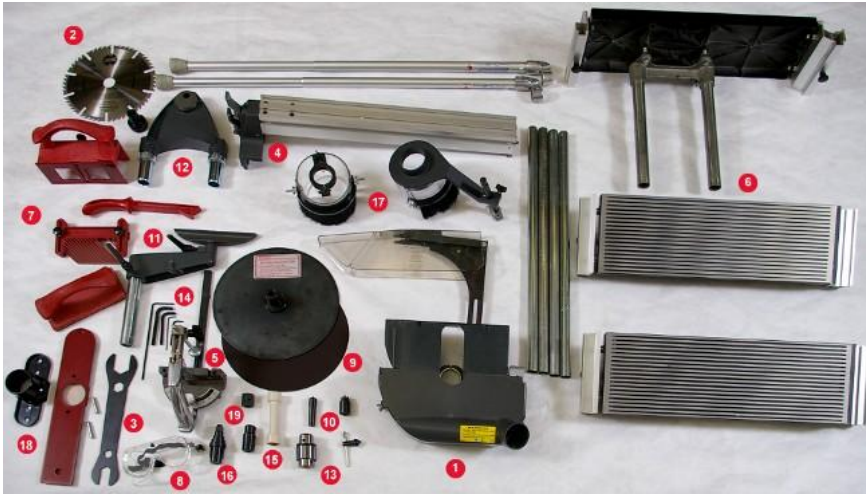
A: Push Stick

B: Push Block

C: Feather Board (later years)

D: Fence Straddler (varies based on rip fence / new table design)

It is worth noting there is a less expensive 505 (budget model), like the 510 but without the floating table option making the base configuration family consist of Mark V 500, 505, 510 and 520 made from 1953 to 2010, followed by the newest Mark 7. You presently can still buy any of them new from the factory with the exception of the 500, or have yours repaired, even factory upgraded. The forums will teach you the DIY methods if that's your focus.



If you're looking at a used Mark 7, and they are out there too; the Standard Accessories will resemble these.

We haven't mentioned the Special Purpose Tools (SPT's) such as Band Saw, Jointer, Belt Sander, Strip Sander, Scroll Saw or Thickness Planers, nor the many optional accessories available. They may be present as well and you will find a wealth of information on those in the forums too.

One might wonder why I included so much info in the document that is already on the web page at Shopsmith Academy. This is a PDF and the operative word in that is 'portable'. It can be attached and emailed detaching it from the site where it was designed to be originally posted for viewers. The Forums and many of the Photos are listed and hyper-linked to bring someone who encounters this document in the wild so to speak, home to their new family here in Shopsmith Forums.

By the way if you press Ctrl+F for 'Find' you can text search this PDF document if you like.

Good luck. I hope the pictures and additional annotations have helped your understanding of the check list.

-Everett-

Write notes on inspected machine condition on the backs of these pages, noting model and serial numbers, and take lots of pictures.