Buying a Used Shopsmith Mark V

A checklist to help you find the bargains and avoid the basketcases

When 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 know-how 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**, **E**xperimental, **R**evised, 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.

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 basketcase useful and productive once again, but it will cost you. And it may cost you many times the purchase price to restored an older machine that has not been well-cared for. So it's worth you 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

The headstock contains an electrical **motor** with a non-standard mount and shaft – you cannot go out a buy one of these off the shelf, so you want to be sure the one you get is in good shape. 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**. As you turn the **speed changer**, the sheaves on one shaft get closer together and the sheaves on the other 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.

- The **Number One Thing** to remember 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 the used Shopsmith in need of expensive repairs.
- Mark Vs 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 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.
- With 1988, Shopmith 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,

- 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 seal 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 replaced. It 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 pokes 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**. 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.
- With the introduction of the Model 510 in 1985, Shopsmith began to cut **T-slots** in the tables rather than standard miter gauge grooves. The also added T-slots to the surfaces of the fence. This helped with the handling of large workpieces 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).
- Checks 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 lowed 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 buggered 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**. The left leg (as you face the speed changer dial and power switch) supports the **headrest**; right leg supports the **base**. The base and the headrest are joined by two **bench tubes**. Two **way tubes** run between the pivoting section of the base and a **way tube tie bar**. The tie bar rests in the headrest and is secured by the **headrest lock** when all four tubes are horizontal. When the way tubes pivot to a vertical position, the **arm lock** secures them. There have been very few improvements to the basic frame over the year; 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 overtightened, 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** the 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 is in place. This is sometimes removed and goes AWOL.

Accessories

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.
- **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, drive center, 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 table doubled.
- **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.