

Tune

Maintenance
tips for height-
adjustment
mechanisms,
collets and
brushes

BY JOHN WHITE



PLUNGE PERK-UP

It takes just a few simple steps to rejuvenate most any plunge router that is suffering from a balky height-adjustment mechanism.



Clean the posts. Remove the springs from the guideposts before cleaning the outside of the posts with WD-40.

Up Your Router

In most shops a router gets plenty of hard work, so it's not surprising that an occasional problem can show up. But just because your router has been acting finicky doesn't necessarily mean it's time to replace it. You can often get it back into tip-top shape if you know where the problems are likely to be hiding. And chances are, the fix won't cost you much time or money.

As manager of the *Fine Woodworking* shop, I get to see quite a few routers. The problems that most of them have had can be distilled into one of three categories.

The main problem I see is related to the height-adjustment mechanism. Over time it may become difficult to adjust. Or it does not lock properly, causing the motor to creep out of position.

Second on my list of common problems has to do with the collet. Sometimes it won't grip the shank of the bit tightly enough, causing the bit to slip.

Worn brushes are the third most common problem. When brushes have worn too much, the motor might not start. If the motor does manage to run, it can unexpectedly cut out under load.

Height-adjustment problems

It's not unusual for the height-adjustment mechanism to stick or bind, especially on a plunge router. When that happens, it's diffi-

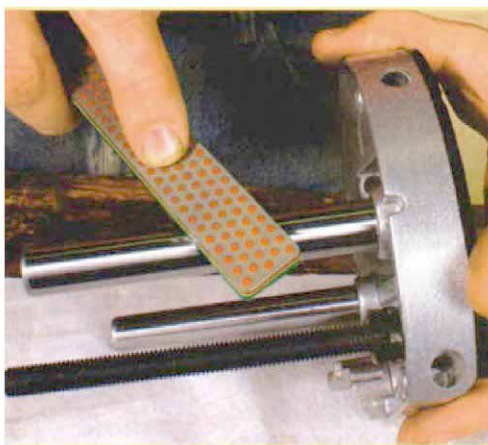
cult to make precise adjustments. When the height adjustment is not working quite right, the first thing to do is check the sliding components and the lock mechanism. A buildup of grime prevents parts from sliding or meshing properly. And parts that aren't properly lubricated suffer the same problem. The fix here is simple enough. It's just a matter of cleaning and lubricating the parts.

Unfortunately, some routers have a complex lock or height-adjustment mechanism that makes disassembly difficult. In this case, first try cleaning and lubing without taking apart the router. Disassemble the machine only if you can't get it to free up.

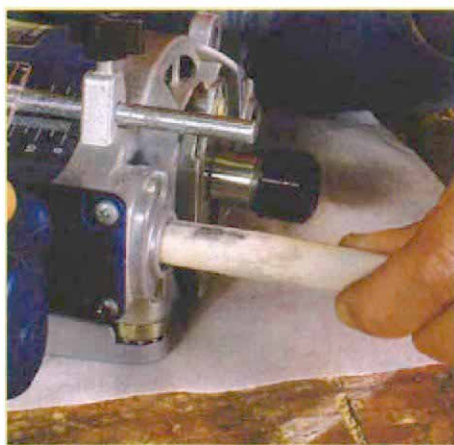
On a plunge router, first remove the springs from the base unit. Then use a penetrating oil, such as WD-40, and a paper towel or rag wrapped around a rod (a wood dowel works fine) to clean out the holes that accept the two guideposts. Then clean all of the old grease off the springs and wipe down the guideposts.

Use a paper towel or a rag wetted with WD-40 to get into the threads, grooves, gear tracks and other nooks and crannies of the lock and depth controls of your machine. An old toothbrush also comes in handy here. Go over any moving or sliding parts, looking for burrs, rough spots, binding or excess wear. Use files, stones and emery paper to correct any problems you find.

Also, examine the springs, nuts and washers for burrs and dis-



Smooth out any burrs. A burr on the guidepost can make for a sticky plunging action, so a little smoothing with a diamond stone could be in order.



Work on the bores. A cleaning stick, made from a piece of paper towel wrapped around a dowel, is used to clean out the holes that accept the guideposts.



Brush on some grease. Give the springs a generous coating of lithium grease before re-installing them in the guideposts.

FIXED-BASE FIX-UP

A finicky height-adjustment mechanism on a fixed-base router can be smoothed out with a minimum of fuss.

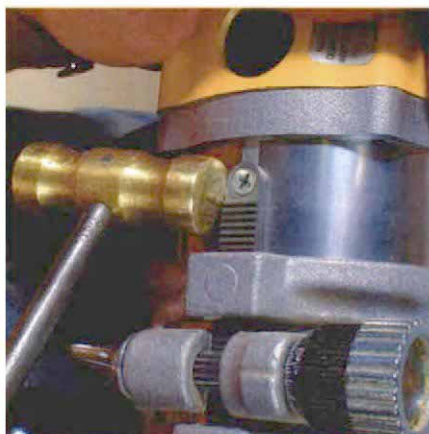


Keep it clean. Wipe down the inside of the base and outside of the motor with penetrating oil, such as WD-40.

Take care of your teeth. Some routers have a rack-and-gear mechanism. Any burrs on the teeth need to be smoothed with a needle file.



A misaligned rack-and-gear mechanism won't operate smoothly. Sometimes it takes just a few light taps from a hammer to realign the parts.



torted or worn-out parts. Washers especially can get cupped or chewed up, making the controls hard to work and lock handles difficult to tighten. If the router has a rack-and-gear mechanism, use a needle file to clean up any burrs down in the gear teeth that can cause interference.

On a fixed-base router, use a paper towel or rag wetted with WD-40 to clean the barrel of the motor and the inside of the base. Some fixed-base routers have a motor housing that threads into the base. Make it a habit to clean out chips and sawdust that get caught between the base and motor. Also, adding an occasional thin coat of wax to the sliding surfaces can reduce wear and help extend the life of the parts.

Eventually, these parts can wear to the point that it becomes hard to thread the motor or lock it in place. If you find that's the case; and if the base is metal, the most cost-effective fix is simply to replace the base. Little can be done for plastic routers because typically both the base and the body are worn out.

Now you can reassemble the machine, lubricating as you work along. Shafts and threads that are somewhat protected from sawdust can get a coat of light oil (such as sewing-machine oil) or lithium grease. On parts that get more exposure to sawdust, such as the guideposts or a sliding motor, it's best to use a stick lubricant or a good wax to make the parts slide smoothly.

Caring for the collet

A typical router bit spins at 25,000 rpm. To prevent slippage, the collet on the router must maintain a viselike grip on the shank of the bit. So it makes sense to keep the collet in good working order.

In time, grime can build up in both the collet nut and the collet, effectively reducing the squeeze on the shank. A collet that isn't properly lubricated can also have less gripping strength.

The nut and collet can also begin to wear or get distorted. And it doesn't take a lot of wear or distortion to cause problems. Indeed, a change of just a couple of thousandths of an inch can prevent the chuck from fully gripping the bit.

A collet that's worn or distorted can lead to vibration. And that could damage the shank of the bit or the inside of the collet. Or it can cause the bit to creep from the collet, changing the depth of cut as you rout. Should the bit creep far enough, the entire shank could come out in the middle of a cut—the woodworking equivalent of a nuclear meltdown.

Fortunately, it takes only a moment to make sure the surfaces of the collet are clean and properly lubricated. The procedure is pretty straightforward. Remove the router bit and unscrew the nut, then lift the collet from the spindle. On some routers, the nut stays attached to the collet.

Once the collet is out, you can blow out any sawdust. Also give a quick visual inspection to the taper inside the end of the spindle. The tapered surfaces should be smooth, almost polished. And the tapers should be straight, not worn into a bell shape.

Check the collet for cracks, which sometimes show up along the edge, particularly on thin-walled collets. Replace the collet if you spot one. Any burrs or rust need to be smoothed out. I use a fine stone on the tapered surface. On the inside, emery paper (220 grit or finer) wrapped around a dowel works well.

It's important to use a light touch when using a stone or emery paper. The idea is to remove the rough spots without changing the shape of the parts. The collet must fit precisely in the spindle



CLEAN THE COLLET

The collet grips the shank of the router bit. But the collet won't grip as well if it isn't clean.



If necessary, remove the ring. Some collets are attached to the nut with a snap ring. External snap-ring pliers, sold by auto-parts stores, are used to remove the ring.

taper. Be sure to clean off any grit left by the emery paper or stones. The grit will cause rapid wear if not removed.

If you find that a bit has spun inside the collet, chewing up the bore, the collet should be replaced. This sort of damage cannot be fixed and will allow bits to slip, damaging their shanks.

If the spindle taper is chewed up, the router is probably due for retirement. On some routers the spindle taper is a separate part that threads onto the end of the spindle. But it typically requires special tools to remove and replace it.

If the critical surfaces are in good shape, it takes just a few steps to clean and lube the parts. Slightly moisten the corner of a paper towel (or clean rag) with WD-40. Then wipe down the inside of the nut, the collet and the inside and outside of the end of the spindle. After that, use your fingernail to get the towel into the threads on the spindle.

Before cleaning the outside of the collet, tear off a small piece of the oil-treated towel and use a thin dowel to force the towel through the bore of the collet. Because the bore is the part of the collet that actually grips the bit shank, you don't want to leave oil residue there. So run some pieces of clean towel through the bore to make sure all of the oil is gone.

Worn-out brushes need replacing

To produce high power in a light, compact package, a router uses a universal-type motor. Common to this motor is a pair of small carbon blocks, called brushes, that rub against the commutator, a part that spins with a surface speed of some 60 mph. These brushes eventually wear down. When they wear too much, the router starts to complain. So it's a good idea to check the brushes once in a while. And replace them before they wear too much.

One sign of worn brushes is an increasing amount of sparking that can be seen through the air vents on top of the router. Another common symptom is a motor that cuts in and out under load, or one that intermittently fails to start.

Running a router with badly worn brushes for any length of time can damage the soft copper surface of the commutator. Once that



Clean out burrs or rust. Use a dowel wrapped in 220-grit or finer emery paper to remove burrs or rust inside the collet.



Make sure the center of the collet is clean. The inside of the collet grips the shank of the router bit. So after cleaning the collet, run several pieces of clean towel through the center of the collet to remove any residual oil or grit.

REPLACING THE BRUSHES

A router with badly worn brushes won't run well. Replace the brushes before they start to cause problems.



Accessing brushes from the side of the router. On a router with side access to the brushes, remove a cap, then simply pull out the brush (along with an attached spring and lead wire) from the motor housing.

Accessing brushes from the top of the router. Some routers need the top housing removed to get at the brushes. Use a paper clip shaped into a long hook to grab and remove each brush.



happens, the replacement brushes are going to wear faster than they should. Or worse yet, the motor may be ruined.

There is no sure guideline for how often to check the brushes for wear. Most owner's manuals recommend a check every 50 to 100 hours of running time. But running time isn't easy to track, so I just check them once or twice a year.

So how do you know when a brush needs to be replaced? A few manufacturers mold a wear line on the brush. Once worn to the line, it's time for a new brush. Most of the time, however, the brush won't have a wear line. When that's the case, check whether the owner's manual tells you when to replace the brush.

If the manual isn't helping (and that's not uncommon), there's a pretty good rule of thumb that applies here: Replace the brush when it becomes shorter than it is wide. For example, a typical $\frac{1}{4}$ -in.-thick by $\frac{3}{8}$ -in.-wide by $\frac{3}{4}$ -in.-long brush (when new) should be replaced when it wears to $\frac{3}{8}$ in. long. By the way, worn or damaged brushes should always be replaced in pairs.

Most router manufacturers have made brush-changing a simple procedure. On many machines, you can reach the brushes by removing two dime-sized plastic caps set 180° apart on the top of the machine. With the caps removed, the brushes will easily slide out of their brass housings. Brushes held in by threaded caps are typically bonded to a spring and lead wire.

Some routers have the brushes inside the plastic housing that covers the top part of the motor. Held on by a few screws, the cov-

er is usually simple to remove, although some makers hide the screws under labeling that must be peeled off or cut. With the cover removed, the brush assemblies should be easy to spot. Most likely, they are going to be held in position by flat coil springs.

A paper clip comes in handy here. Straighten the clip and bend one end into a small hook. Slip the hook under the spring, then pull it back to release the brush. Be careful, though. The brush could shatter if the spring snaps back against it.

After checking the length of the brush, it's also a good idea to inspect its general condition. A bad electrical connection or heavy use can burn the brush, causing it to crack or crumble.

While you have the brushes out of the router, take a moment to look over the springs and lead wires that usually are attached to the back of the brush. On the springs, look for evidence of burning or cracking. And check the wire to see whether it is frayed, broken or even pulled out of the brush. Any one of these problems is a good reason to install fresh brushes.

Replacement brushes are typically available from the manufacturer. If they can't supply brushes because the motor is too old, a motor repair shop might be able to help. By the way, when installing new brushes, make sure they slide easily into their housings. If they don't, file them down as needed to get a good fit. □

Watch it on the web

Visit finewoodworking.com for John White's tips on replacing a router's brushes.

In addition to his work as a contributing editor, John White also helps keep the Fine Woodworking shop in smooth running order.