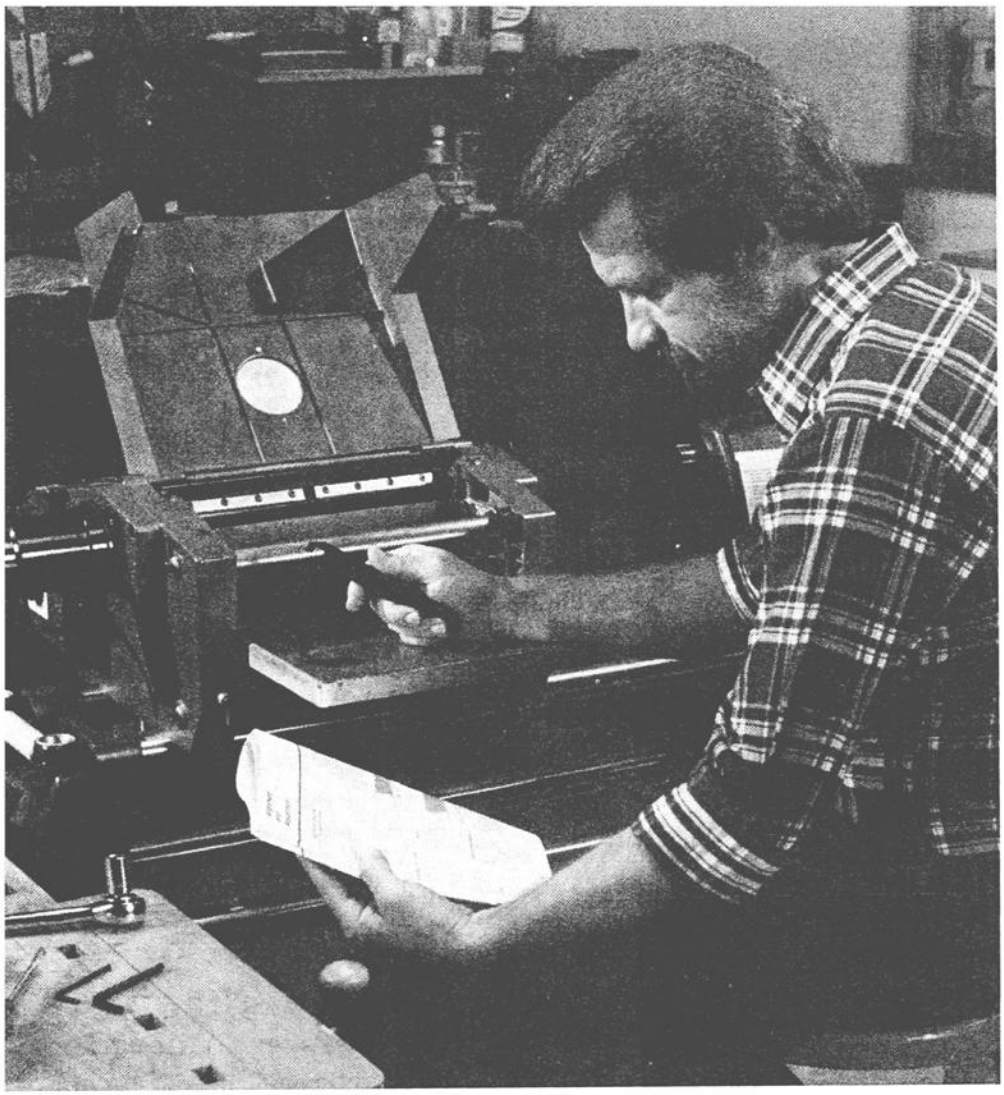
Alignment and Adjustment



Aligning and Adjusting Your Shopsmith Thickness Planer

Your Shopsmith Thickness Planer will perform precise thicknessing and surfacing operations, but the quality of the cut will only be as good as your final adjustments. It's important to complete all of the designated alignment and adjustment procedures during the initial setup — and then recheck the alignment of your thickness planer at regular intervals.

WARNING: The thickness planer MUST be unplugged from its power source before performing any adjustment, maintenance, or repair procedure. DO NOT rely solely on the power switch.

Knife Mounting System

The planer cutterhead holds three knives. Each knife is held in the cutterhead by two metal wedges with four locking screws through each wedge. In all, eight locking screws hold each knife in place. (See Figure 1.)

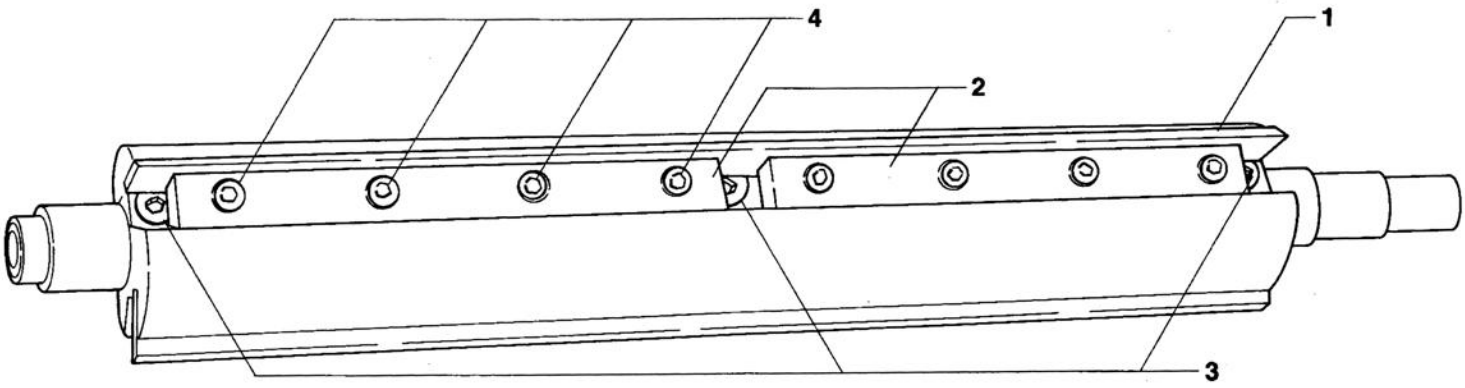


Figure 1. Each planer **knife (1)** is held in the cutterhead by two **wedges (2)** with four **wedge locking screws (4)** through each wedge. There are three **knife leveling screws (3)** — one under each end and one under the middle of each knife to adjust the height of that knife.

In addition, the knives themselves are wedge shaped. Each knife is slightly thicker at the bottom than it is at the top. When properly seated the wedges and the knives interlock. Shopsmith employs this special design as an extra precaution to keep the knives secured in the cutterhead.

WARNING: Use only Shopsmith Planer Knives in the Shopsmith Planer. Other brands of knives are not wedge-shaped and will not seat properly in the cutterhead. USING OFF-BRANDS OF KNIVES IS EXTREMELY DANGEROUS.

Tip: Check the wedge locking screws **immediately** if an unusual noise, vibration, or uneven cuts develop — and after every 10 hours of use as a general practice.

There are also three knife leveling screws under each end and under the middle of each knife. (See Figure 1.) These screws allow you to adjust all three knives to precisely the same height without the need for costly and time-consuming match grinding.

Checking Knife Positions

Knife position is **the** most critical adjustment on the planer. All knives must be positioned **identically** — both side-to-side and top-to-bottom. To check knife positions, follow this procedure:

1. Disconnect the power, slide the Mark V headstock away from the planer, and remove the power coupler.

2. Raise the outfeed shield. Turn the two hold-down latches that lock the outfeed shield in place 1/2 revolution down. Swing the shield up and out of the way.

3. Check the side-to-side knife positions. The ends of the knives should be flush with the sides of the cutterhead. (See Figure 2.) Place your fingertips on one side of the cutterhead and slowly rotate it one full revolution. Check, by feeling, that each knife is even with the side of the cutterhead.

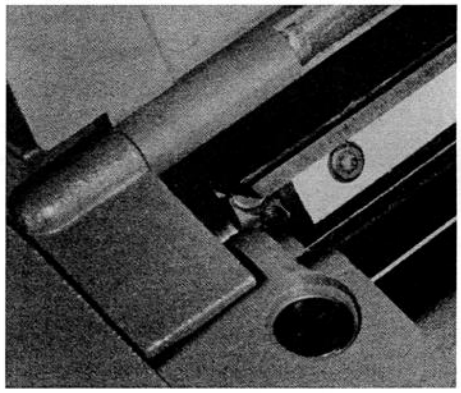


Figure 2. The ends of each planer knife should be flush with the sides of the cutterhead.

4. Check the height of one knife, using the knife setting gauge supplied with your planer. Place the square slotted end of the gauge over the right end of the outfeed tie bar, and let the tip of the gauge rest on the cutterhead. Turn the cutterhead to position a knife under the arc of the gauge. (See Figure 3.)

Insert the 5/32" Allen wrench in the right knife leveling screw. (The Allen wrench and the knife setting gauge should be close together, but they must not interfere with each other.) Using the wrench as a lever, slowly rock the cutterhead back and forth so that the knife passes the 'shoulder' of the gauge several times. If the knife height is correct, the cutting edge will **barely touch** the arc

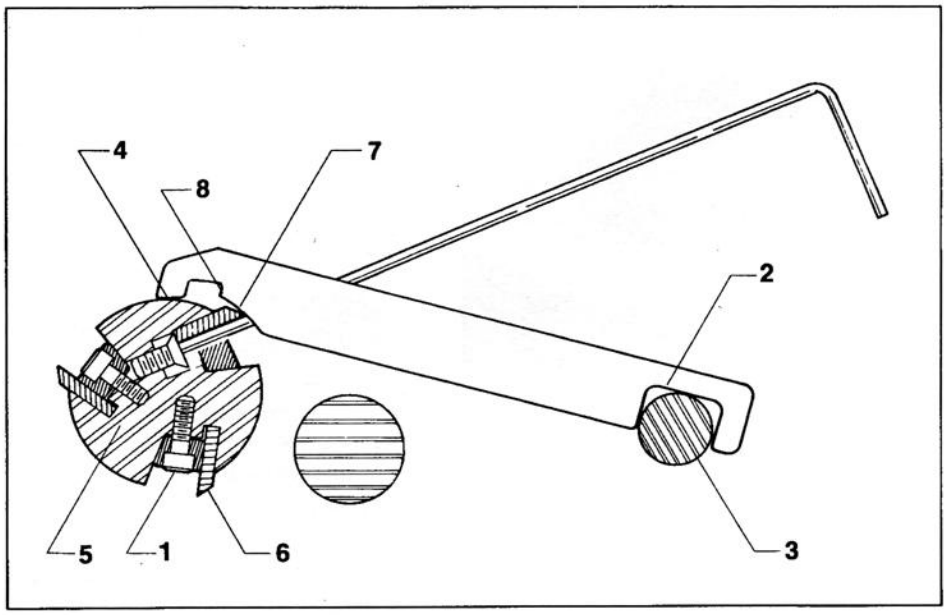


Figure 3. When using the **knife setting gauge (1)** to check or adjust knife height, seat the square **slotted end (2)** of the gauge over the **outfeed tie bar (3),** and let the **tip (4)** rest against the **cutterhead (5).** Rotate the cutterhead to position a **knife (6)** under the **arc (7)** of the gauge. When the knife height is properly adjusted, the cutting edge of the knife will barely touch the arc without catching on the **shoulder (8)** or lifting the tip from the cutterhead.

without catching on the shoulder or lifting the tip of the gauge from the cutterhead. (See Figures 3 and 4.) If the knife catches on the shoulder, lifts the tip of the gauge, or does not contact the gauge, the knife height is incorrect.

Repeat this procedure at the middle and the left end of the knife. Be certain the knife height is correct and exactly the same from one end of the knife to the other.

5. Repeat Step 4 for the other two knives. Make certain that the knife height is correct and exactly the same from knife to knife.

If these checks indicate any problem — if the ends of the knives are not flush with the sides of the cutterhead or if the heights of the knives are incorrect or uneven — follow the instructions in "Removing, Installing, and Adjusting Knives" in this section.

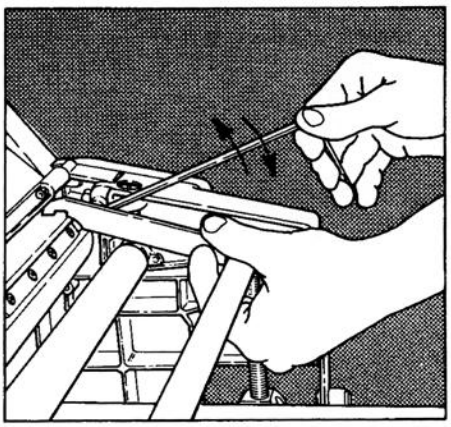


Figure 4. Insert the 5/32" Allen wrench in a knife leveling screw near the knife setting gauge, and use the wrench as a lever to slowly rotate the cutterhead while you check the height of the knife. Be sure the Allen wrench and the gauge do not interfere with each other.

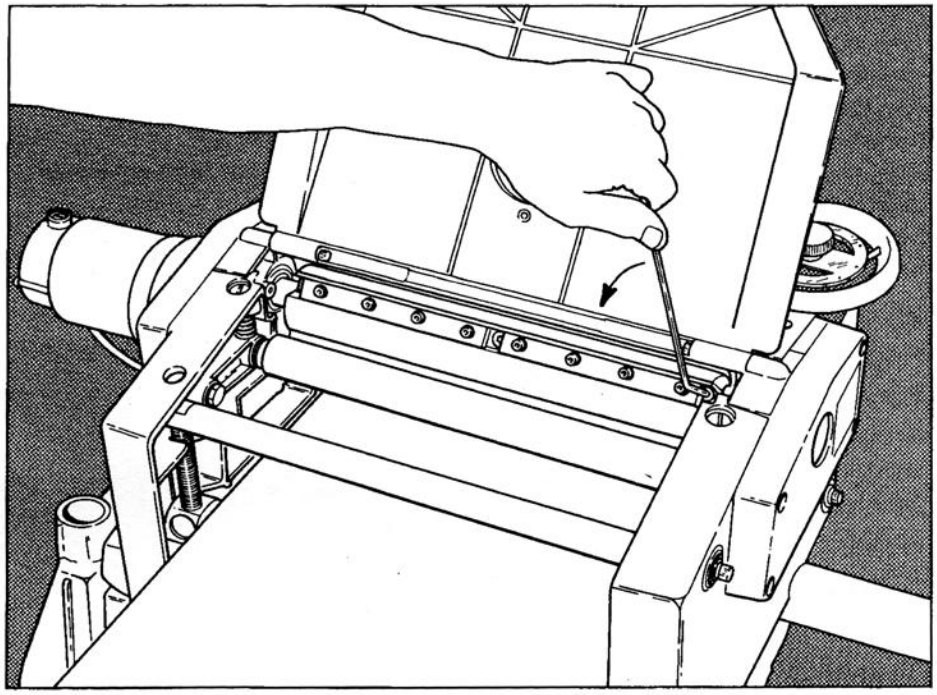


Figure 5. To loosen the wedges, begin by turning each knife leveling screw 1/4 revolution counterclockwise with the 5/32" Allen wrench. Working carefully from right to left, repeat as necessary until the wedges pop loose.

Removing, Installing and Adjusting Knives

Removing, installing, and adjusting knives is a tedious (but important!) procedure. To avoid problems, lay parts out neatly on your workbench as you remove them, and return all knives, wedges, and screws to their **original position** in the cutterhead.

Follow these instructions carefully, working on just **one knife at a time:**

Removal

1. Disconnect the power, slide the Mark V headstock away from the planer, and remove the power coupler. Raise the outfeed shield out of the way.

2. Loosen the wedge locking screws on one knife. With the 5/32" Allen wrench, turn all eight wedge locking screws counterclockwise 2-3 revolutions. Do not remove them completely at this time.

3. Pop the wedge lock loose. Using the 5/32" Allen wrench again, turn the right knife leveling screw counterclockwise 1/4 turn. (See Figure 5.) This usually requires a strong twist if the wedges are properly seated. Move to the middle screw and turn it 1/4 turn, then the left screw.

Repeat this procedure, moving from right to left, turning each knife leveling screw 1/4 turn at a time, until the wedges pop loose. Working carefully from left to right relieves the pressure on the knife in such a way that it prevents the knife from flexing and possibly breaking.

4. Remove the knife and wedge locking assembly. Once the knife is loose, remove it from the cutterhead. Handle the knife carefully; it's very sharp and somewhat brittle. It may chip or break if dropped.

When you've removed the knife, back the wedge locking screws out of the wedge all the way. Remove both wedges, and finally remove the knife leveling screws.

5. Repeat steps 2 through 4 for the other knives.

6. Clean all components. Wipe the cutterhead, knives, wedges, and screws with mineral spirits or oven cleaner to remove sawdust and wood pitch. Scrape any dust or pitch buildup out of the mounting grooves in the cutterhead.

Once the knives have been cleaned, inspect them closely. If they are chipped or damaged, you may wish to have them sharpened by a professional sharpening service before reinstalling them. If the knives are dulled from use, you may want to 'touch them up' with a fine whetstone once you've reinstalled them. See "Honing Knives on the Thickness Planer" in the **Maintenance** section.

Installation and Initial Adjustment

Once you're ready to reinstall the knives in your planer, pull up a chair. Proper installation and adjustment takes about an hour — a chair to sit on while you work will save your back. You may also want to shine a lamp on the planer to give yourself plenty of light. (See Figure 6.)

As you work, notice that the adjustment procedure is divided into two parts — initial adjustment and final adjustment. By bringing the knives close to their proper positions, then going back and making fine adjustments, you can achieve a high degree of accuracy with a minimum of trouble.

7. Reinstall the knife leveling screws in the cutterhead, turning them clockwise 8-9 revolutions, or until they 'bottom out'. **Do not** tighten them down.

Figure 6. When you get ready to reinstall the knives in your planer, first be sure that planer is unplugged. Then pull up a chair and get comfortable — installation will take about an hour of careful work. Plenty of light also helps.

8. Install one knife loosely. Set a knife in place with the cutting edge pointed toward the outfeed side of the machine. Put the two wedges in place and align them with the screw holes in the cutterhead. **Be certain** that the square side of the wedges butt up against the knife as shown in Figure 7.

Seat the wedge locking screws in their sockets with the 5/32" Allen wrench, then back them out one revolution. **Do not tighten the wedge locking screws yet.** If you have trouble starting the screws, check which way the wedges are turned. They may be in backwards.

9. Set the side-to-side knife position — The planer knife should be centered so that the ends of the knife are flush with the sides of the cutterhead.

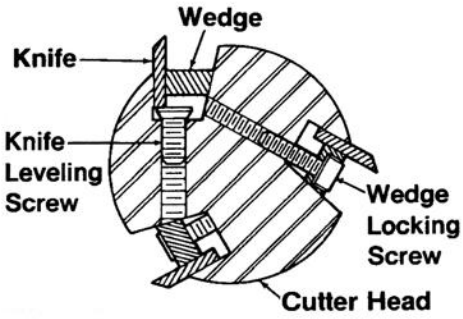


Figure 7. When reinstalling a knife in the cutterhead, be sure the cutting edge points toward the outfeed side of the machine. The square side of the wedges should butt up against the knife, as shown.

10. Adjust the height of the knife to within 1/64" of its correct position. Place the knife setting gauge over the right end of the outfeed tie bar as described in "Checking Knife Positions" earlier in this section. Insert the 5/32" Allen wrench in the right knife leveling screw. Slowly rock the cutterhead back and forth so that the knife passes the shoulder of the gauge. At the same time, turn the screw counterclockwise until the edge of the knife **almost** touches (comes within 1/64" of) the arc of the gauge. (See Figure 8.)

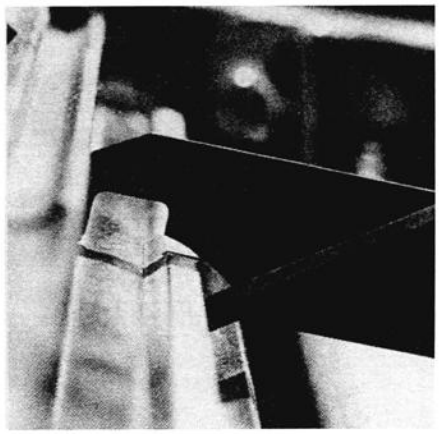


Figure 8. Initially, adjust the knife height so that the cutting edge **almost** touches the arc of the knife setting gauge, as shown. You'll need to make the final adjustment in a later step.

Alignment and Adjustment

Repeat this procedure for the middle and left knife leveling screws. Then 'snug up' all eight wedge locking screws, turning them just one revolution clockwise to seat them. **Do not completely tighten the wedge locking screws at this time.** If you tighten these screws past 'snug', the wedge will seat and you won't have the freedom to make the final height adjustment. You may also bend or break the knife.

Final Adjustment

11. Adjust the height at the right and left ends of the knife. Replace the knife setting gauge near the right knife leveling screw. Insert the Allen wrench in this screw and rock the cutterhead back and forth. Carefully turn the knife leveling screw until the knife **barely touches** the arc of the gauge.

Repeat this procedure for the **left** knife leveling screw, skipping over the middle screw for the moment. When you have made the final height adjustment at both ends of the knife, tighten the extreme right wedge locking screw in the right wedge, then the extreme left wedge locking screws in the left wedge. (See Figure 9.) Leave the other wedge locking screws alone for the moment.

After tightening these screws, recheck the knife height at both ends of the knife. Tightening the screws may move the knife slightly. If this happens, loosen the wedge locking screws and pop the wedge loose again. Readjust the knife height, compensating for the movement.

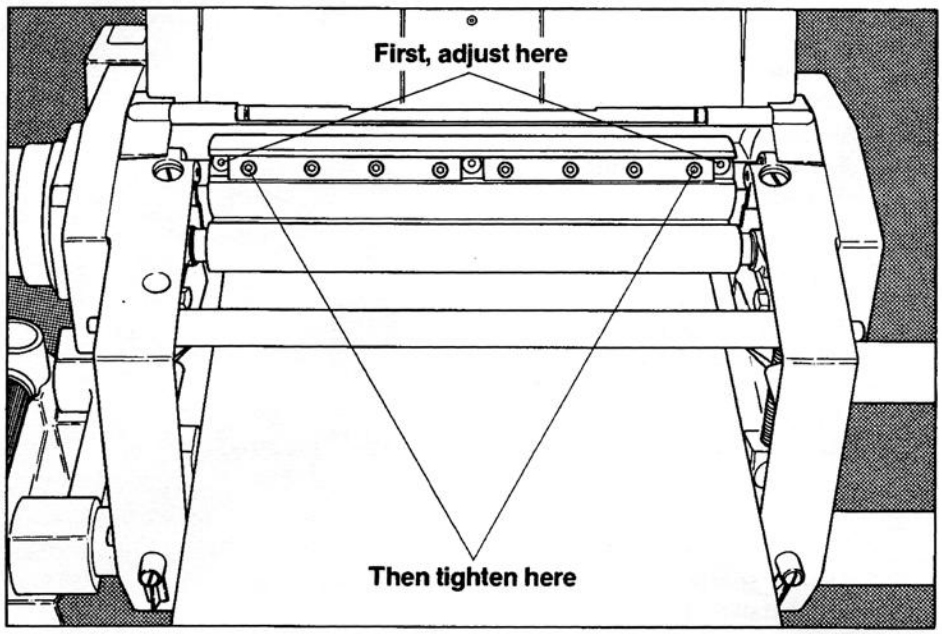


Figure 9. When you have completed the final height adjustment at both ends of the knife, tighten down the extreme right wedge locking screw in the right wedge and the extreme left wedge locking screw in the left wedge, as shown.

12. Adjust the height at the middle of the knife. Make the final height adjustment in the middle of the knife. When you have completed this adjustment, tighten the extreme left wedge locking screws in the right wedge and extreme right wedge locking screw in the left wedge. (See Figure 10.)

When the wedge locking screws on either end of each wedge are tight, recheck the knife height at the middle and both ends of the knife. If the knife has moved, loosen the wedges and readjust the knife, compensating for the movement. When you're satisfied the knife is correctly positioned, tighten down the four remaining wedge locking screws. (See Figure 11.) Then go back and check to see that **all eight** wedge locking screws are tightened securely.

13. Repeat Steps 8 through 12 for the other two knives, then test all 24 wedge locking screws to make sure they're properly secured. Once you're sure the wedge locking screws are tight, recheck the knife positions for all three knives. Remember, knife positions must be **identical** from knife to knife.

14. Lock the outfeed shield back down. It's also wise to check the infeed shield in case any of the screws holding it in place have vibrated loose.

WARNING: The wedge locking screws must be tightened down and the shields must be secured before you can safely operate the planer. Check these components after you install and adjust the knives, and at regular intervals as you use the planer.