PORTA-NAILS, INC.

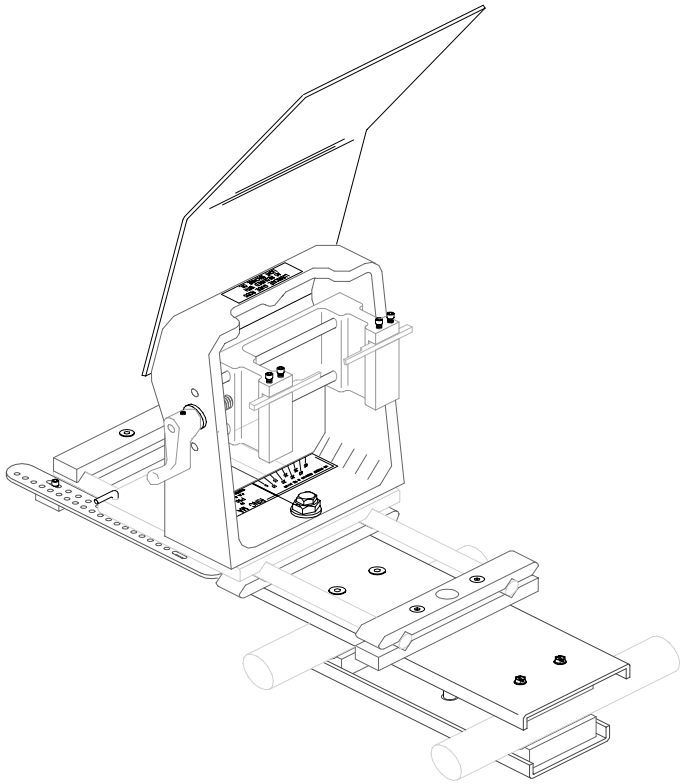
ISO 9001 REGISTERED

owners manual

RING MASTER

For the Shopsmith® Mark V

Cat. No. 730



CAUTION - Read important safety instructions AND operation instructions, BEFORE operating your RING MASTER (CAT.NO. 730).

Your new RING MASTER is a quality-built machine, capable of dependable performance throughout its lifetime. To take full advantage of these capabilities you should thoroughly understand the proper method and technique of its operation. Therefore, we suggest you read this manual before operating and that you save itfor future reference.

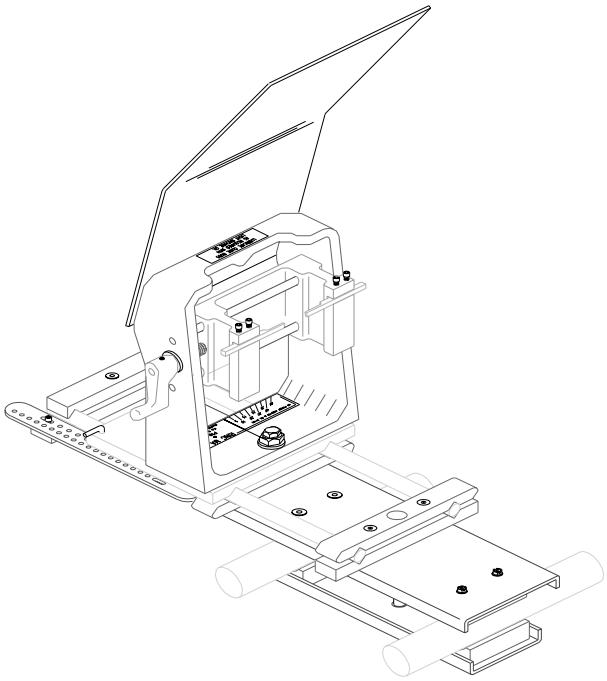
- **Assembly**
- **Operation**

FORM PN 301041 11/94

RING MASTER - SHOPSMITH ® MARK V

CAT. NO. 730

OPERATING INSTRUCTIONS



YOUR RING MASTER ONE YEAR WARRANTY

PNI (PORTA-NAILS, INC.) Is proud of Ring Master and its quality. The component parts of this machine are inspected at various stages of production, and each finished machine is inspected before packing. Because of our confidence in the BUILT-IN quality, PNI agrees to repair or replace any part or parts of Ring Master which upon our examination prove to be defective in workmanship or material. In order for the user to take advantage of this guarantee, the complete machine or component part must be returned prepaid to PNI for examination and prompt action. This guarantee, of course, does not include repair or replacement due to misuse, abuse, or normal wear and tear. Repairs made by other than factory authorized personnel, relives PNI of further liability under the guarantee. THIS GUARANTEE IS MADE EXPRESSLY IN PLACE OF ALL OTHER GUARANTEES OR WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO QUALITY, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE. This guarantee ends one year after date of purchase.

PNI reserves the right to change or modify the design and/or specifications of ring Master at any time without prior notice to any user.

General Safety Instructions for Power Tools

1. **KNOW YOUR POWER TOOL**
   Read the owner's manual carefully. Learn its applications and limitations as well as the potential hazards specific to this tool.
2. **GROUND ALL TOOLS**
   PNI power tools are equipped with an approved 3-prong grounding type plug to fit the proper grounding type receptacle. The green conductor in the cord is the grounding wire. Never connect the green wire to a live terminal.
3. **KEEP GUARDS IN PLACE**
   Be sure guards are in working order, and in proper adjustment and alignment.
4. **REMOVE ADJUSTING KEYS AND WRENCHES**
   Check to see that keys and adjustment wrenches are removed from tool before turning it on.
5. **KEEP WORK AREA CLEAN**
   Cluttered areas and benches invite accidents. Floor must not be slippery due to sawdust.
6. **AVOID DANGEROUS ENVIRONMENT**
   Do not use power tools in damp or wet locations or expose them to rain. Keep work area well lit. Provide plenty of surrounding work space.
7. **KEEP CHILDREN AWAY**
   All visitors should be kept a safe distance from work area.
8. **DON'T FORCE TOOL**
   It will do the job better and safer at the rate for which it as designed.
9. **USE THE RIGHT TOOL**
   Don't force tool or attachment to do a job it was not designed for.
10. **WEAR PROPER APPAREL**
    Do not wear loose clothing, gloves, neckties or jewelry (rings, wrist watches) that could get caught in moving parts. Wear non slip footwear. Wear protective hair covering to contain long hair. Roll long sleeves above the elbow.
11. **USE SAFETY GOGGLES (Head Protection)**
    Wear safety goggles at all times. (Must comply with ANSI Z87.1). Everyday eyeglasses have impact resistant lenses only. They are NOT safety glasses. Also, use face or dust mask if a cutting operation is dusty. Wear ear protectors (plugs or muffs) during extended periods of operation.
12. **SECURE WORK**
    Use a vise or clamps to hold work when practical. It is safer than using your hands. This will free hands allowing them to operate the tool.
13. **DO NOT OVERREACH**
    Keep proper footing and balance at all times.
14. **MAINTAIN TOOLS WITH CARE**
    Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.
15. **DISCONNECT TOOLS**
    Before servicing or changing accessories such as blades, bits, cutters, etc., disconnect from electrical and air supplies.
16. **AVOID ACCIDENTAL STARTING**
    Make sure switch is in "OFF" position before plugging it in.
17. **NEVER LEAVE TOOL RUNNING UNATTENDED**
    Turn power off. Do not leave tool until it comes to a complete stop.

Additional Safety Instructions for Ring Master

WARNING: FOR YOUR OWN SAFETY, DO NOT ATTEMPT TO OPERATE YOUR RING MASTER UNTIL IT IS COMPLETELY ASSEMBLED AND INSTALLED ACCORDING TO THE INSTRUCTION...AND UNTIL YOU HAVE READ AND UNDERSTAND THE OWNERS MANUAL.

1. If any part of your Ring Master is malfunctioning, has been damaged or broken, cease operating immediately until the particular part is properly repaired or replaced.
2. Never place your fingers in a position where they could contact the cutting tool.
3. **INSPECT YOUR POWER TOOL THOROUGHLY** Set up your RING MASTER according to instructions. Make sure all parts are included.
4. **KEEP CUTTING TOOLS SHARP** - Be sure to keep cutting tools sharp. Dull tools can cause rough cuts, tool overheating, excessive chipping and ACCIDENTS.
5. **SAFETY SHIELD** - Though you plan to use safety glasses, do not remove the safety shield. TWO SHIELDS ARE BETTER THAN ONE, or none.
6. **FOLLOWING OPERATING INSTRUCTIONS** - All procedures should be followed. They have been developed to insure safe operation AND complete satisfaction with your RING MASTER.
7. **THINK SAFETY** - Carefully plan each operation before turning on tool. Plan each step through to the point when you turn motor OFF.

SAFETY INSTRUCTIONS

BE SURE TO FOLLOW ALL SAFETY INSTRUCTIONS BEFORE, DURING AND AFTER THE OPERATION OF YOUR RING MASTER!

Assembly

1. Locate index plate (Item A), (1) #10-32 screw 5/8" long, with washer (Items B) and attach index plate to right end of "rod base". PLACE SCREW THROUGH SLOT in index plate.
2. Remove complete "swing plate" assembly (Item C) from slide plate.
3. Find Polycarbonate face shield (Item D) and attach to swing plate using (3) #8-32 screws and trim washers (Item E).
4. Replace swing plate on slide plate with crank handle on the RIGHT SIDE using the swing lock screw and 3/8" washer. (Items F)
5. Find 3/16" index pin (Item G), move slide plate away from rear of machine. Loosen index plate lock screw, and insert index pin through hole in right rear of slide plate into any hole in index plate. Note, there is a small slot into which the index plate lock screw fits, slide the index plate fully to the rear and tighten the lock screw. The above procedure merely aligns the index plate hole pattern with the index pin. You will repeat this procedure each time you loosen or move the index plate.

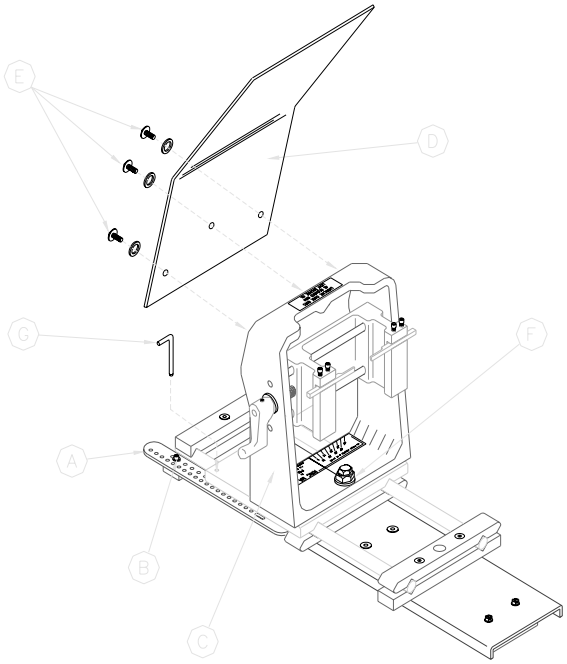


FIGURE 1

ATTACHING RING MASTER TO SHOPSMITH ® MARK V

1. Insert the 4" long 3/8" cap screw (Item H) down thru the base and into the threaded insert of bottom clamp. Be sure clamp pads face each other.
2. Turn the bottom clamp (Item J) so it is PARALLEL with the way tubes, and insert clamp down thru the two way tubes.
3. Rest the base on the way tubes, swing the bottom clamp 90 degrees so the clamp pads align with the way tubes.
4. Tighten the 3/8" cap screw with the 5/16" hex wrench. DO NOT OVER TIGHTEN THIS SCREW. If in later use the base seems loose, slightly tighten the 3/8" screw.

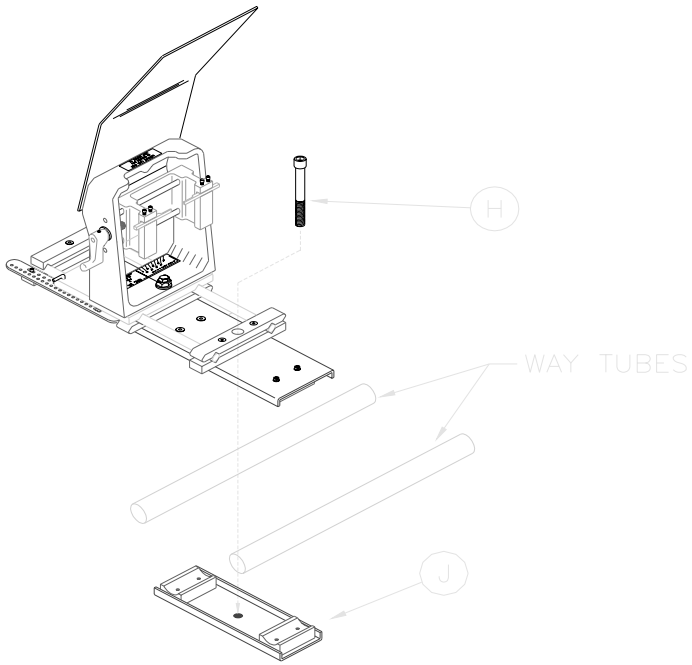


FIGURE 2

RING MASTER SET UP INSTRUCTIONS

CAUTION: Use only knot and crack free "tight grain" wood. DO NOT cut any other material.

PREPARE THE WOOD FOR MOUNTING ON THE RING MASTER

1. Cut wood in squares not over 11-1/2".
2. Find the center of each square and mark with a punch.
3. Using a compass, draw the largest circle possible inside the wood square.
4. Drill a 1/2" hole in the center. A 1/2" hole will permit mounting on RING MASTER.
5. After drilling, saw corners off being careful not to saw inside of the circle. See **FIGURE 3**.

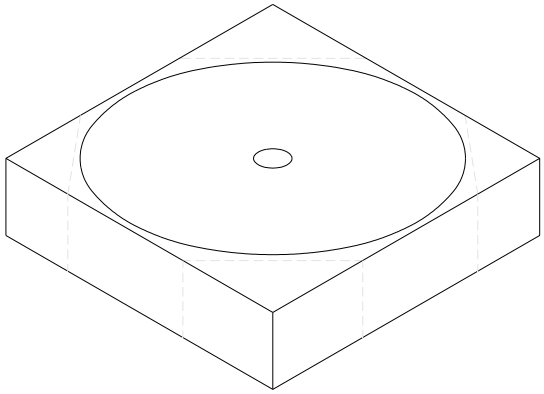


FIGURE 3

MOUNTING THE WOOD ON THE MARK V

Attach the arbor, provided, to the Mark V, and the wood to the arbor using the 2" washer and 1/2" nut and 3/4" wrench provided. Place the thick metal washer on the arbor first, then the wood, thin washer, and then the 1/2" nut. Slide the head stock of the Mark V toward the Ring Master until the wood is directly over the center of the Ring Master or until the head stock is as close as it will possibly go. Lock the head stock in place. If necessary, extend the Quill the minimum amount to center the wood over the Ring Master and lock the Quill in place.

INSTALL AND ALIGN THE CUTTING TOOL

The cutting tool consists of two blades, a left and a right hand blade. Install blades in proper left and right hand positions and clamp in place using locking screws and small hex wrench.

Hold a steel straight edge against the blades and view from above. If the blades are not properly aligned, loosen locking screws and re tighten as required to insure alignment.

Check alignment periodically during operation. **BE SURE** no sawdust gets into the blade slot as proper alignment will not be possible. See "POSITIONING THE CUTTING BLADES" for proper blade alignment.

HOW TO DETERMINE THE CUTTING ANGLE

There are two variables involved in the proper cutting angle: thickness of the wood and thickness of the cut. The index plate controls the thickness of the cut to a 5/16" increment.

To calculate the cutting angle, draw a straight line vertically on a sheet of paper, place your wood on edge perpendicular to the line and draw a line on each side of the wood (See **FIGURE 4**). Measure 5/16" along the top line and mark point "B". Draw a line between points "A" and "B" and measure angle "X" with a protractor. This is your cutting angle for that thickness of wood.

If you are cutting 3/4" wood the angle is about 22 1/2 °, and EVERY TIME YOU CUT 3/4" wood the angle will be the same. The cutting angle for 1/2" wood is about 32 ° and 3/8" about 39 1/2 °.

Once the cutting angle has been calculated, align the degree setting on the swing plate with the scribe line on the slide plate. Lock the swing lock.

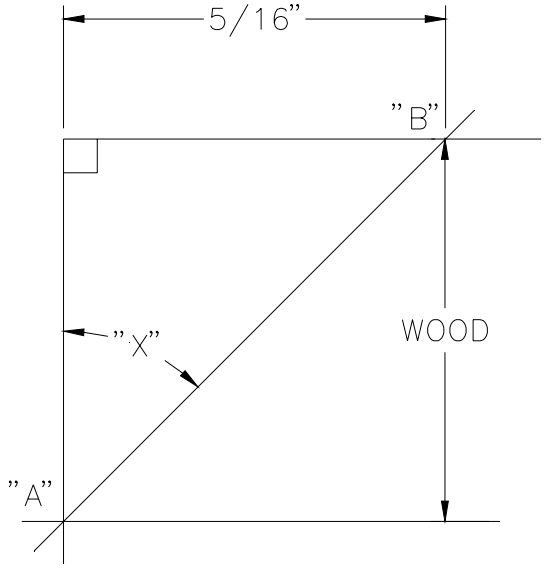


FIGURE 4

PRIOR TO ANY POWER ON OF YOUR MARK V, be sure to refer to your Shopsmith ® Mark V owners manual lathe turning chapter for complete information on the correct operation of the Mark V.

POSITIONING THE CUTTING BLADES

Unlock the slide lock, slide assembly forward and position cutting blades until both left and right blades will engage the wood. Locate the nearest index stop with the index pin. Unlock the index plate lock screw and move index plate to the rear, and tighten the lock screw. Lock slide lock. To adjust swing plate reference #34, loosen front slide plate lock bolt, reference #28, loosen swing plate lock bolt, reference #29. Adjust swing plate to desired angle and re tighten.

BY HAND, rotate wood one full revolution to insure that both left and right blades will engage wood. **See FIGURE 5**. If you find that the left blade will not engage the wood, unlock slide lock, remove index pin and slide forward to engage the NEXT index hole. Replace index pin and lock slide lock.

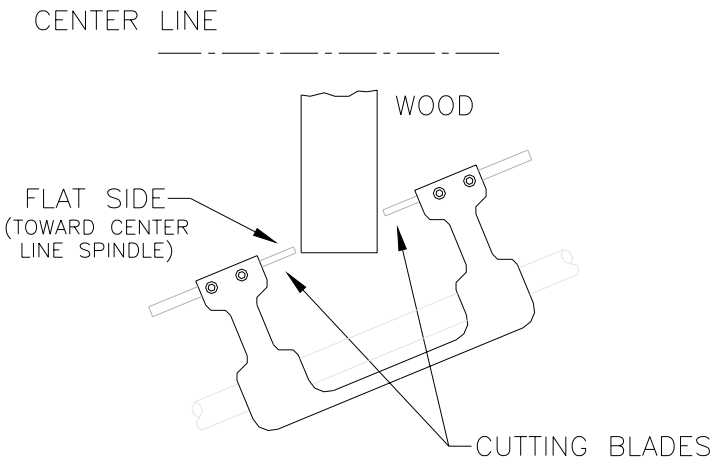


FIGURE 5

CUTTING SPEED

You may vary the R.P.M. depending on the diameter of the ring. Cut the largest 10-11" dia. rings at slow (700 R.P.M.) and raise the speed NOT TO EXCEED "C" (900 R.P.M.) for the smallest rings.

RING MASTER OPERATING INSTRUCTIONS

Now that you have set up the RING MASTER to properly cut your rings, you are ready to begin. Remember to observe proper safety precautions when operating the RING MASTER.

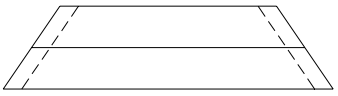
Start motor, turn lead screw clockwise and advance left blade very slowly into the wood. (NOTE: When cutting, always advance the blade slowly. Should you attempt to cut too rapidly, chattering, vibration, checking of your work piece, or misalignment of the cutting blade may result.) Since each revolution yields 1/13" of movement, advance slowly for about six turns in 3/4" wood or until halfway through wood. Then reverse the turn and start to cut from the right side. Move slowly until you notice a change in the sound of the cutting. As the ring starts to fall off to the right, STOP the motor and clear the ring from the machine. You will have to unlock the slide lock to remove the ring.

You'll note the outer shape of this first ring is octagonal and will not mate with any other ring, lay this ring aside for OTHER use.

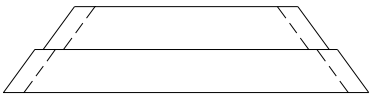
To cut the next ring adjust the blades to clear on both sides of the ring and slide forward for the next cut. Replace the index pin and lock the slide. NEVER ATTEMPT TO CUT A RING WITHOUT FIRST LOCKING THE SLIDE LOCK. Repeat the process explained above to cut your next ring.

After cutting two rings, stack the small ring on top of the larger as shown in **FIGURE 6**. This will indicate if the cutting angle is correct. (NOTE: Having calculated and set the cutting angle on the degree scale is no guarantee that the rings will be cut with a good alignment. A good match of the rings can now be accomplished with minor adjustment of the cutting angle. If the top ring is larger at its base than the bottom ring, the angle must be decreased slightly. If the top ring is smaller at its base than the bottom ring, the angle must be increased slightly. If the rings do no match closely, adjust the angle and cut TWO more rings to check for acceptable alignment.

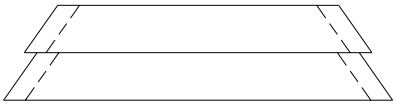
FIGURE 6



Good Alignment



Increase Angle For Good Alignment



Decrease Angle For Good Alignment

CHANGING THE CUTTING ANGLE TO 90 DEGREES

After you have cut a number of angle rings, you will want to cut some straight or 90 degree rings whose outside diameter will match the angle rings already cut. Leave the last of an angle cut piece on the spindle with the lock nut in place. Set the wing plate to 90 degrees and lock. Remove the index pin, slide the blade forward until the left blade **just touches** the left portion of the wood. See **FIGURE 7**. When contact is made with the wood, lock the slide lock.

Unlock the index plate and slide forward until the index pin will engage the nearest hole. Lock the index plate screw.

Unlock slide lock and pull cutting assembly to the rear. Remove angle cut wood and replace with a new piece of wood. You are now ready to proceed with cutting straight rings.

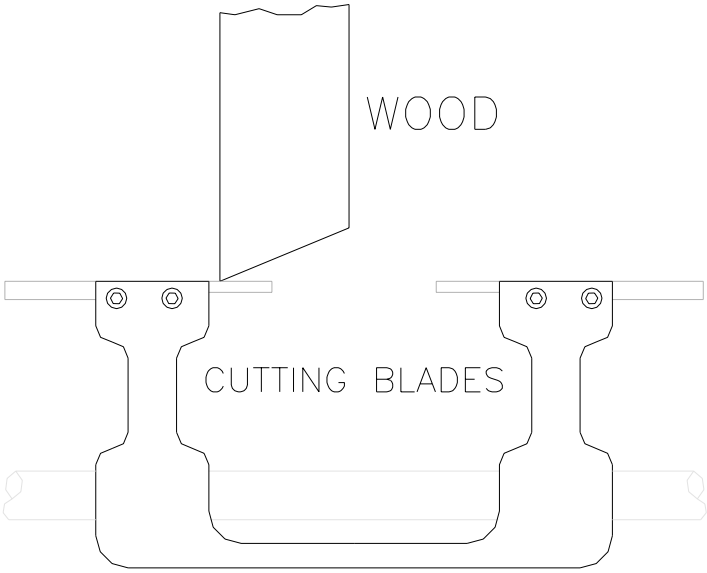


FIGURE 7

CUTTING A STRAIGHT RING

The procedure to cut a straight ring is the same as cutting an angle ring.

Slide the cutting blades to the wood and insure that both blades will fully engage wood. Insert index pin in nearest hole and lock slide. **BY HAND**, rotate wood one full revolution to insure blades will engage wood on both sides for the full circle. Start motor. Cut first from the right and then the left. As the cutting sound changes and the ring starts to move, stop the motor and clear the ring from the machine. Cut a second ring in the same manner. (The first ring will have and octagonal outer shape and will be unusable for mating with an angle cut ring.)

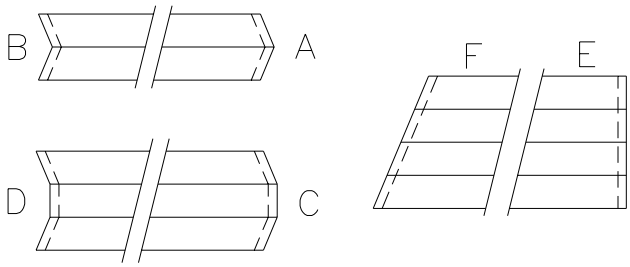
If the above instructions were followed correctly, the second straight ring will match the outside diameter of an angle ring cut earlier. If it does not match the outside diameter of and angle ring, repeat above instruction but be careful to just touch the blade to remnant of angle wood.

WORKING WITH THE RINGS

After you have cut a supply of angle and straight rings, the fun begins. **FIGURE 7** illustrates the basic ways in which you can put the rings together to form different shapes. What you make, how large you make it, what wood or combinations of wood you use, and the finish you apply is all up to you. Now that you have cut rings around wood, you can create any hollow cylindrical wooded project.

REMEMBER, RINGMASTER can easily DUPLICATE any project you make.

FIGURE 7



A. Two identical rings for sharp outside curve or;
B. Two identical rings for sharp inside curve.
C. Two identical angle rings used with mating straight ring to yield a soft outside curve or;
D. Two identical angle rings used with mating straight ring to yield a soft inside curve.
E. A number of straight rings stacked.
F. Mating angle rings, possibly all cut from the same piece of wood.

GLUING YOUR PROJECT

Once you have decided on the shape of your project, it is time to glue it together. Use any furniture glue that is water soluble. Tight Bond Glue by Franklin is good. It is helpful to use a gluing jig like the one shown in **FIGURE 8**. It is actually a 3/8" threaded rod and a wing nut. Most projects will be glued upside down to utilize the 1/2" spindle hole found in the center ring.

Start with the ring that is on the open end of the project, lay it on the gluing jig and apply glue to the top surface of the ring. Place the next ring on top and glue its top surface. Continue until the last piece with the 1/2" hole is in place. The last piece acts as a part of the clamp. Place a washer and the wing nut on the threaded rod and tighten until some glue is squeezed out from between the rings. Use a damp cloth to remove any excess glue.

Then loosen the clamp, check to see that the rings are still aligned as you wish, and re tighten the clamp firmly.

See "RECOMMENDED ACCESSORIES (Options)" for information on ordering a GLUE/CLAMPING FIXTURE.

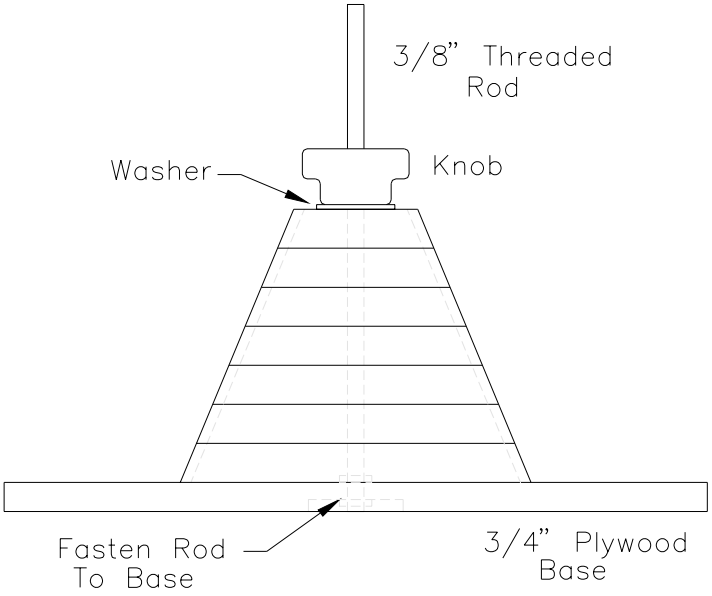


FIGURE 8

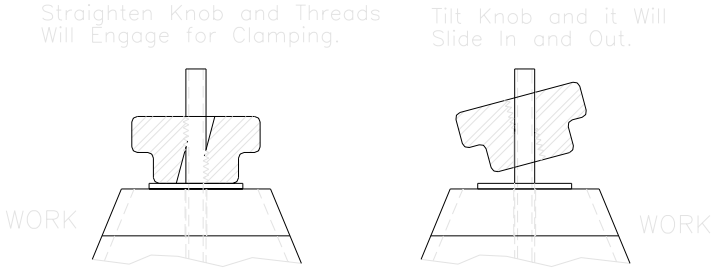


FIGURE 9

FINISHING YOUR PROJECT

Once your project has been glued, and dried overnight, you may return your project back to the Mark V for sanding, detailing and finishing. Simply fit the 1/2" hole in the bottom of your project back on the arbor and tighten 1/2" nut.

Your STEADY REST and LATHE KNIVES can be used in the usual way for detailing. However, only sand paper will yield a nice finish. Use you choice of finish, for a fine project.

Remember, using RING MASTER, you can easily duplicate any project.

HAVE FUN!

RECOMMENDED ACCESSORIES (Options) CATALOG NUMBERS

1. Replacement Cutter Blade (Double End) 70140
2. Replacement Cutter Set (Double End - High Speed) 70141
3. 1/2" Diameter Drill With 1/4" Shaft 70130
4. Glue/Clamping Fixture 70100
5. 1/2" Plug Cutter 70160
6. Cutter Pre-Set Gauge 70138
7. Drum Sander 2 1/2" x 3" 70165

MAINTENANCE

Keep your Ring Master clean. If compressed air is available, blow each part clean after use. Keeping the lead screw clean of saw dust is very important.

ADJUSTMENTS

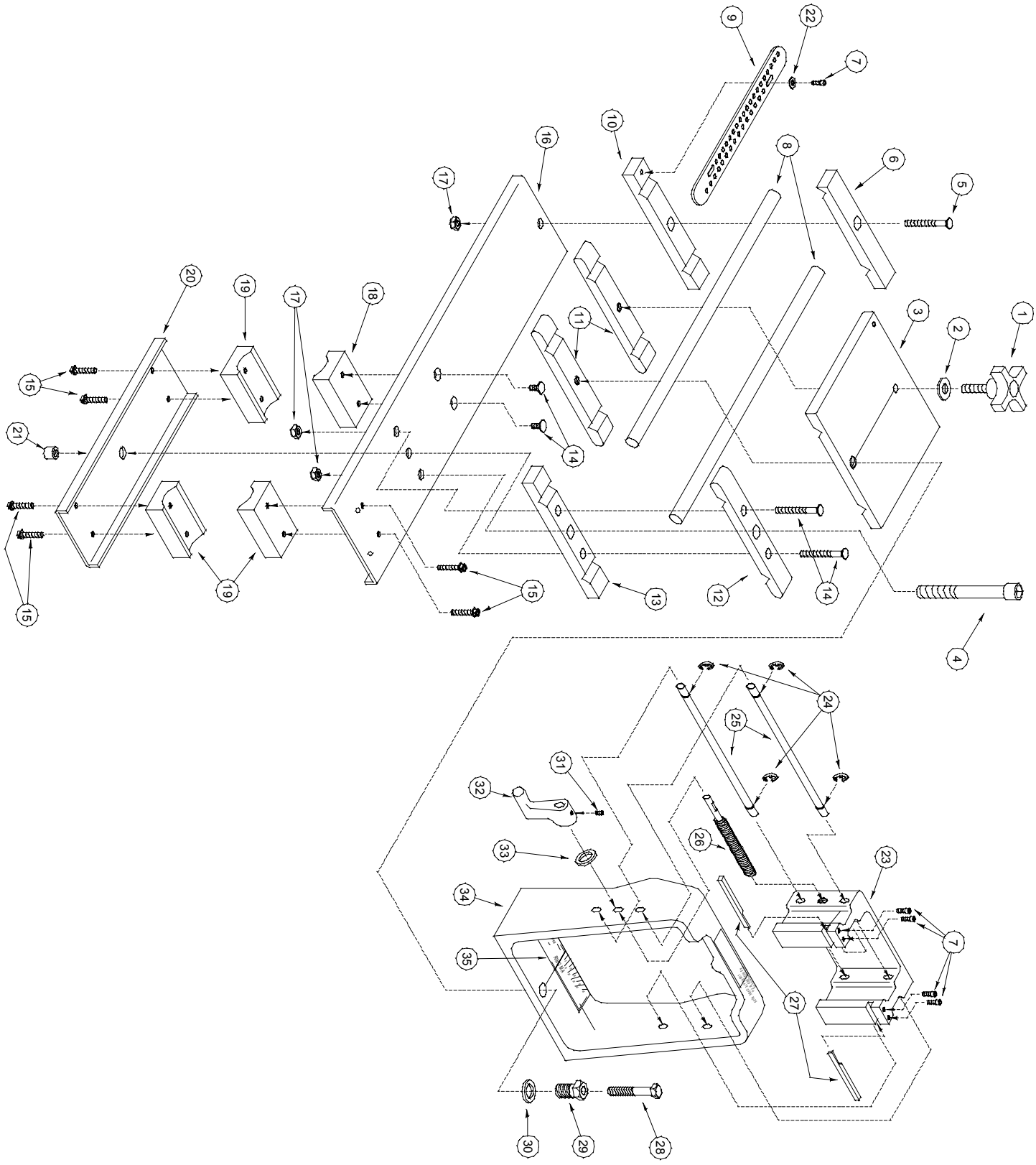
End play may occur in the lead screw. If it occurs, correct the situation as follows:

LEAD SCREW: Loosen set screw on handle (Reference #31) and press tool holder (Reference #23) toward handle (Reference #32). As you press handle toward tool holder tighten set screw.

TROUBLE SHOOTING

WARNING: For your safety, turn switch "off" and always remove plug from power source before trouble shooting.

TROUBLE	PROBABLE CAUSE	REMEDY
Chattering	Cutting Feed too Fast Dull Cutter Blade Misalignment	Advance Cutter Slowly Sharpen or Change Cutter Realign Cutters
Excessive Chipping	Feed too Fast	Slow Down
Cutter Darkens	Cutter Dull	Sharpen or Replace Cutter
Excessive Vibration	Base Not Clamped	Clamp or Bolt Base Down
Feed Screw Binding	Dirt or Dust Build-up	Dis-assemble - Clean Use Multipurpose Grease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Key Number	Part Name	Part Number
1	Knob	301442
2	Washer	301427
3	Slide Plate	301440
4	Screw, Socket Cap 3/8-16	301079
5	Screw, Socket Flat Head 1/4-20	301020
6	Rod Clamp	301204
7	Screw, Socket Cap 10-32	301422
8	Guide Rod	301069
9	Index Plate	301404
10	Rod Base	301203
11	Slide Lock	301202
12	Front Rod Clamp	301207
13	Front Rod Base	301206
14	Screw, Socket Flat Head 10-32	301482
15	Screw, Self Tap #10-1/2	301438
16	Base, Slide Rod	301047
17	Hex Nut, Nylok 1/4-20	301070
18	Pad, Tapped	301092
19	Pad, Drilled Only	301068
20	Bottom Clamp Base	301072
21	Bushing, 3/8-16	301073
22	Washer, SAE #10	301423
23	Tool Holder	301205
24	Retainer Ring	301432
25	Slide Rod	301302
26	Lead Screw	301305
27	Cutter Set, Single End	70139
28	Screw, Hex Head Cap 3/8-16	301441
29	Swing Plate Lock Screw	301443
30	Washer, 5/8" I.D. 1" O.D.	301444
31	Screw, Socket Set 10-32	301434
32	Handle	301103
33	Washer, Torrington	301430
34	Swing Plate	301307
35	Degree Scale Decal	301416
36	Safety Shield	301403
37	Wrench, 3/4 Open-9/16 Box (Not Shown)	301415
38	Wrench, Hex Short Arm 5/16" (Not Shown)	301437
39	Wrench, Hex Short Arm 3/32" (Not Shown)	301426
40	Wrench, Hex Short Arm 5/32" (Not Shown)	301424
41	Arbor, 1 1/8" O.D. 5/8" I.D. (Not Shown)	301050
42	Index Pin (Not Shown)	301421
43	Screw, Flat Head Machine (Not Shown)	301435
44	Washer, #8 Bright Finish (Not Shown)	301436