

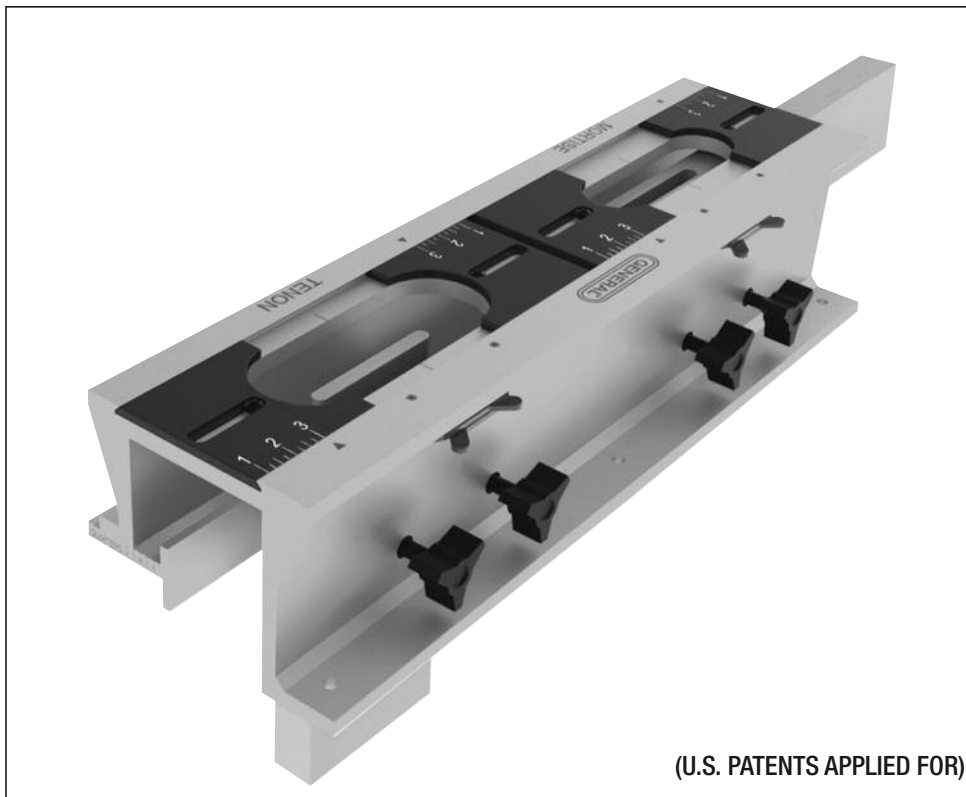
**GENERAL<sup>®</sup>**

**E•Z Pro<sup>™</sup>**

# MORTISE & TENON JIG

## No. 870

*USER'S MANUAL*



(U.S. PATENTS APPLIED FOR)

***PLEASE READ THESE INSTRUCTIONS FULLY BEFORE USING THIS JIG***

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Sample Mortise & Tenon Joints

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## INTRODUCTION

Thank you for purchasing General Tools & Instruments' **E-Z™ Pro Combination Mortise & Tenon Jig** (M&T Jig)— the woodworking industry's first integrated jig capable of making matching mortise and tenon joints of professional quality "right out of the box." The jig makes creating Mortise & Tenon joints—the sturdiest of all wood joints—for furniture, cabinets and frames – an easy, simple and fast process.

The Mortise & Tenon Kit comes with a fully assembled jig and includes a 1/4" straight upcut router bit and 1/4" tenon *Guide Bushing*. Also included are the guide bushings for cutting 3/8" and 1/2" joints. You will need to supply your own 3/8" and 1/2" upcut router bits.

The **M&T Jig** has a one-piece heat treated, high grade aluminum body with adjusting bolts, upcut fasteners and bit made of steel to SAE specifications. The unit's adjustable *Positioning Bars* and *Router Bushing* assembly are also made of solid steel.

### **Capacity and Specifications:**

Accommodates stock from 1/2" to 1½" thick and any length

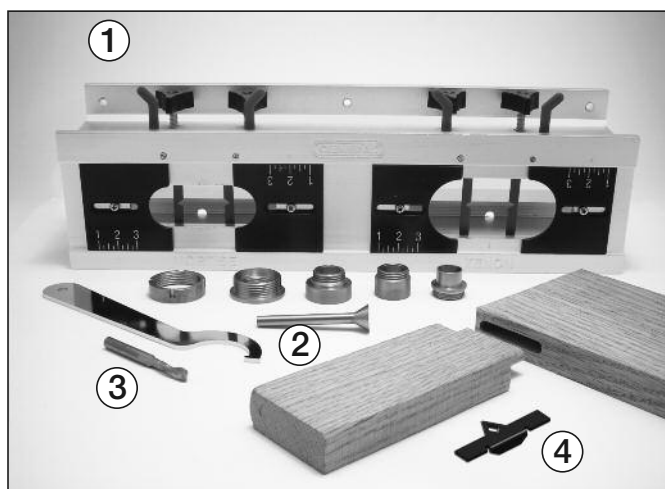
Mortise and Tenon thickness: 1/4", 3/8" and 1/2"

Minimum length M&T Joint: 1" +/- 1/8" (depending on bit used)

Maximum Length M&T Joint: 3" +/- 1/8" (depending on bit used)

### **What's in the M&T Jig Kit**

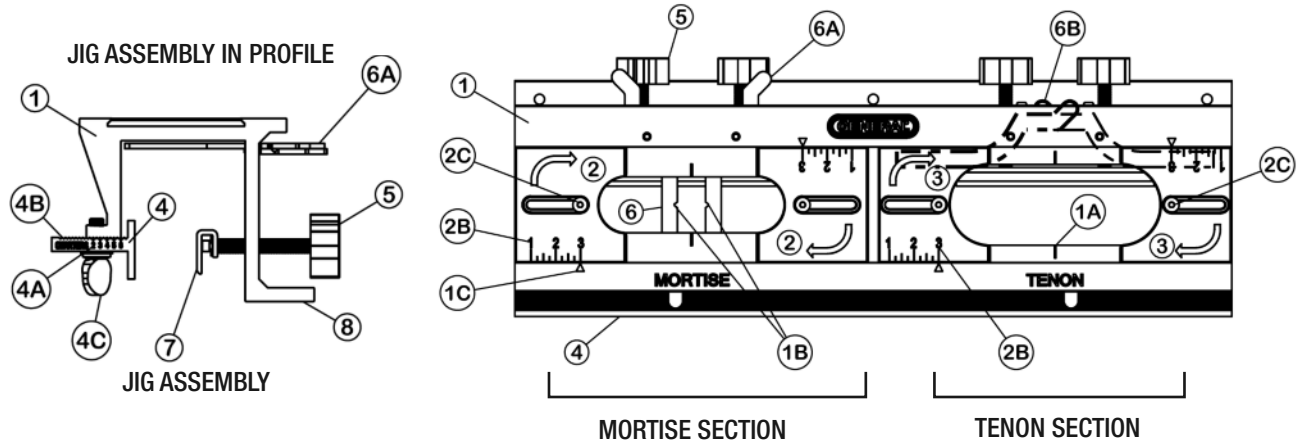
1. The fully assembled jig
2. "Quick Change" *Router Base Bushing* assembly consists of:
  - One "Quick Change" 1-3/16" *Guide Sleeve* and *Locking Nut*
  - One 1/4" *Guide Bushing* (1-1/4" OD)
  - One 1/4" shank *Centering Pin*
  - One flat *Spanner Wrench* for guide sleeve *Locking Nut* adjustment
  - One 3/8" *Guide Bushing*
  - One 1/2" *Guide Bushing*
3. One 1/4" straight *Upcut Spiral Carbide Router Bit*
4. Alignment Tool



**It is highly recommended that you familiarize yourself with the nomenclature in Fig. 1 and Fig. 2 on p. 4 before proceeding.**

# ANATOMY OF THE E-Z PRO MORTISE & TENON JIG

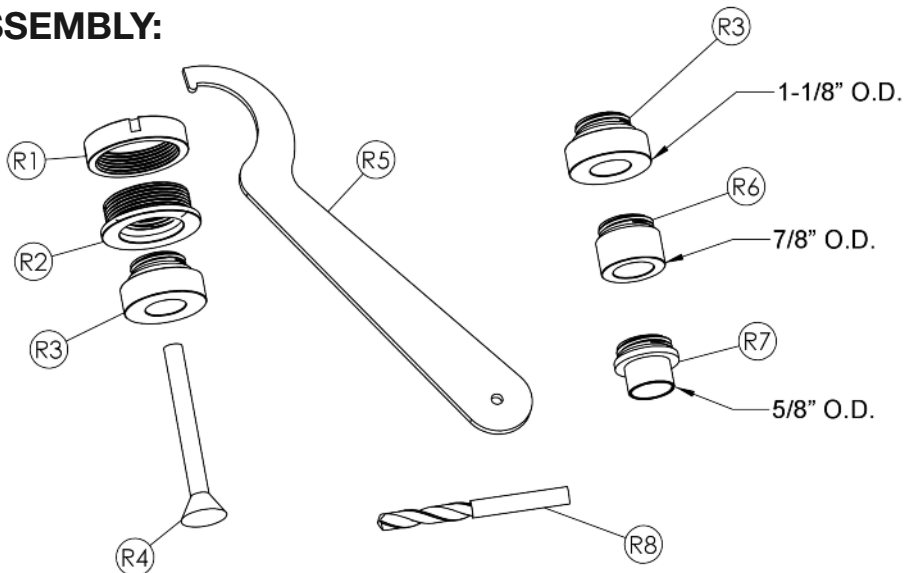
Fig. 1



- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li><b>1</b> - Jig Assembly</li> <li><b>1A</b> - Centering Marks</li> <li><b>1B</b> - Centering Notches</li> <li><b>1C</b> - Template Positioning Indicators</li> <li><b>2</b> - Mortise Section Templates</li> <li><b>2B</b> - Template Position Rule</li> <li><b>2C</b> - Template Lock Screws</li> <li><b>3</b> - Tenon Section Templates</li> </ul> | <ul style="list-style-type: none"> <li><b>4</b> - Centering Wall, [4A] Markings, [4B] Serrations, [4C] Thumb Screws</li> <li><b>5</b> - Face Clamp Thumb Screws</li> <li><b>6</b> - Positioning Bars</li> <li><b>6A</b> - Positioning Bars deployed</li> <li><b>6B</b> - Positioning Bars retracted for storage and cutting</li> <li><b>7</b> - Face Clamps</li> <li><b>8</b> - Mounting Flange</li> </ul> |
|--|--|

# ANATOMY OF THE "QUICK CHANGE" ROUTER BASE BUSHING ASSEMBLY:

Fig. 2



- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li><b>R1</b> - Lock Nut</li> <li><b>R2</b> - 1-3/16" Router Base Guide Sleeve</li> <li><b>R3</b> - 1-1/8" O.D. Router Guide Bushing for the 1/4" Tenon (as well as for all mortises)</li> <li><b>R4</b> - Centering Pin</li> </ul> | <ul style="list-style-type: none"> <li><b>R5</b> - Flat Spanner Wrench</li> <li><b>R6</b> - 7/8" O.D. Router Guide Bushing for the 3/8" Tenon</li> <li><b>R7</b> - 5/8" O.D. Router Guide Bushing for the 1/2" Tenon</li> <li><b>R8</b> - 1/4" Upcut Routing Bit</li> </ul> |
|--|---|

## PREPARING THE ROUTER

### SAFETY OVERVIEW

1. **KNOW YOUR ROUTER.** Read the owner's manual that came with your router before you use it. Understand the machine's applications and limitations, as well as the specific potential hazards inherent in its use. Before using the router, check that none of its moving parts is broken, loose or misaligned.

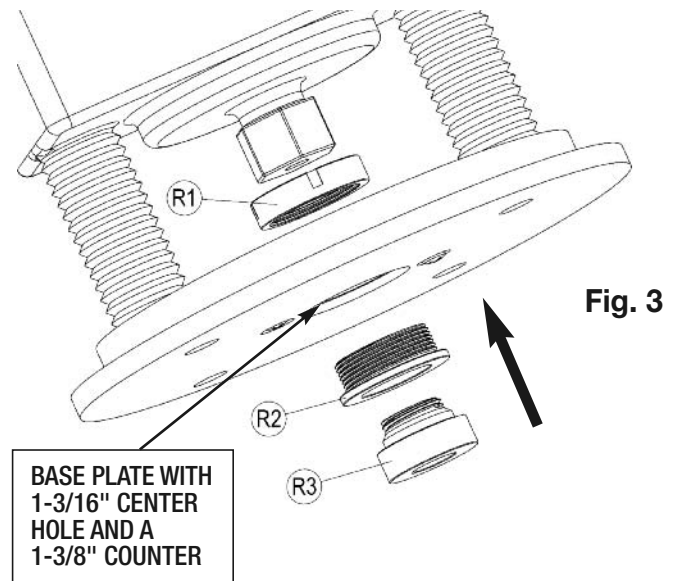
**NOTE:** General Tools & Instruments is not responsible for router misuse or the disregard of standard safety precautions associated with using a router.

### Installing the "Quick Change" Guide Sleeve

The E•Z Pro **M&T Jig** is designed to be used with plunge routers with base plates with a 1-3/16" center hole and a 1-3/8" counter-bore. This is to accommodate the included "Quick Change" guide sleeve and bushing. If your router base cannot mate with the guide sleeve, you can purchase a "Universal Router Plate" with the appropriate center hole dimensions to attach to or replace your current router base.

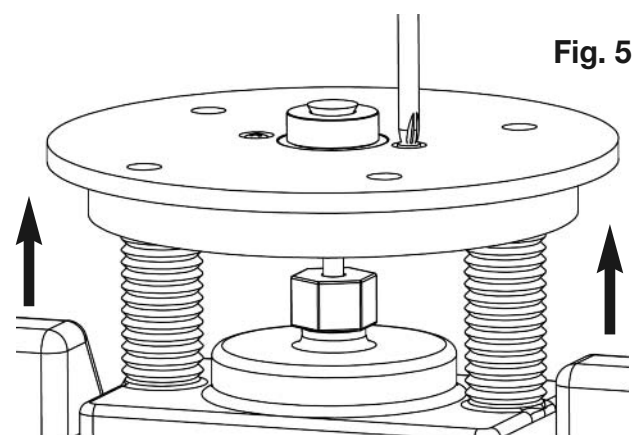
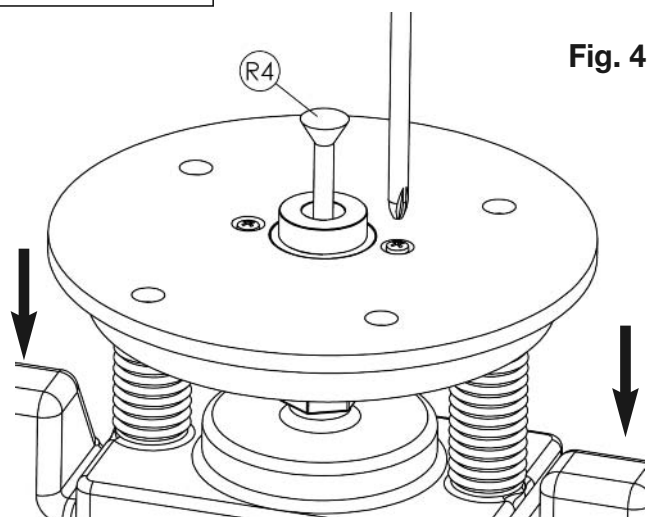
With the proper base plate installed:

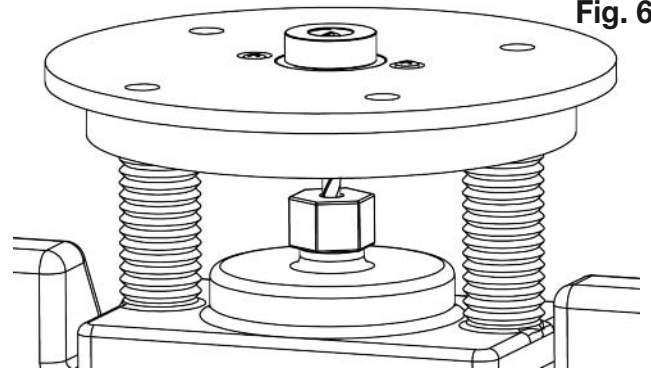
1. Insert the *Guide Sleeve* [R-2] into the base plate.
2. Secure the *Lock Nut* [R-1] firmly with the flat *Spanner Wrench* Provided.
3. Screw the 1-1/8" *Router Guide Bushing* [R-3] into the center of the *Guide Sleeve* and hand tighten. (Fig. 3)



### Centering the Base Plate and the "Quick Change Guide System"

1. With your router upside down, plunge the base plate and lock it.
2. Insert the 1/4" *Centering Pin* [R-4] in the router chuck and tighten it securely.
3. Loosen the mounting screws of the base plate just enough to allow a little movement. (Fig. 4)
4. Carefully release the plunge lock and gently guide the plunge base to extension on the cone section of the *Centering Pin*; (Fig. 5) this allows the loosened base plate to move on its screw holes to a perfect centering position.
5. Tighten the base plate screws securely.

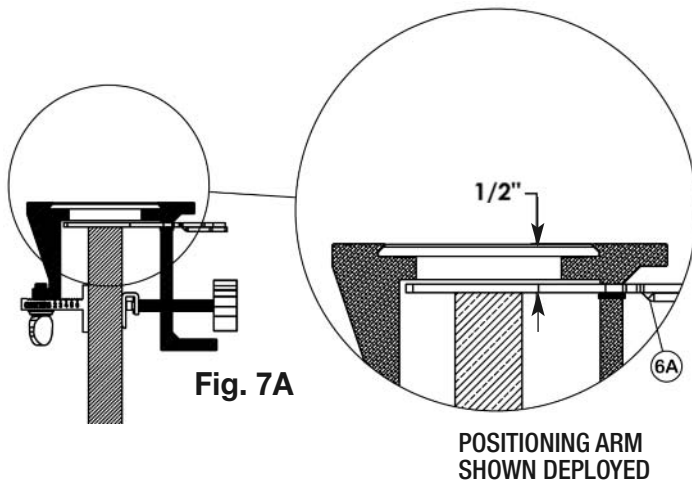
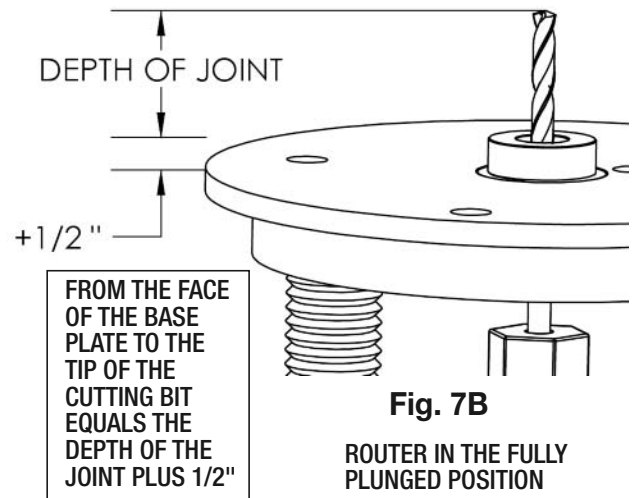


**Fig. 6**

- Once you have completed this centering operation, remove the *Centering Pin* from the router and replace it with the router bit (**Fig. 6**).

### Setting the Cutting Depth

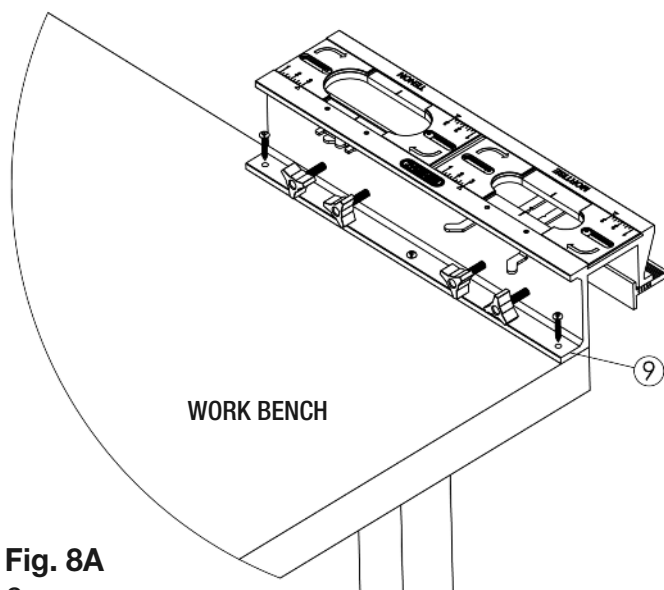
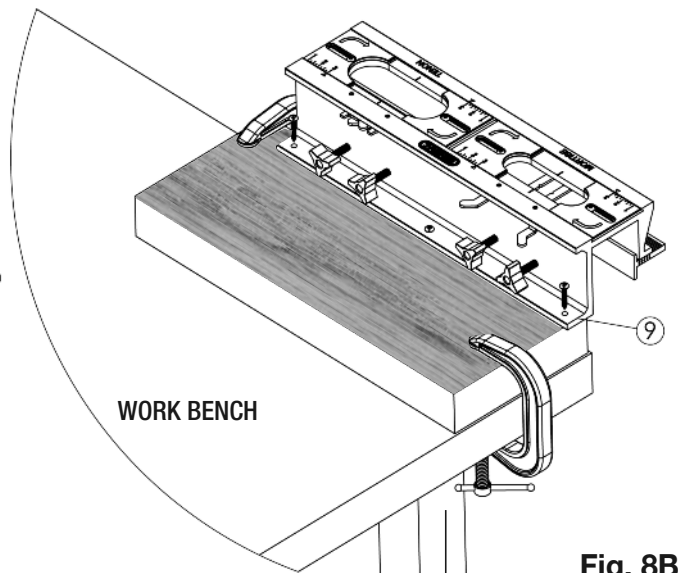
- Set the depth of your plunge router for the desired depth of your mortise and tenon.
- When the stock is correctly mounted in the jig, its top edge will be 1/2" below the top (working) surface of the jig (Fig.7a).
- Accordingly, add 1/2" to the desired depth of the mortise and tenon when setting the "plunge" depth of the router (Fig.7b).

**Fig. 7A****Fig. 7B**

ROUTER IN THE FULLY PLUNGED POSITION

### MOUNTING THE JIG

The **M&T Jig** can be mounted directly on the edge of a bench using the integral mounting flange [9] (Fig. 8A), or secured to a mounting board which can then be clamped to a bench (Fig. 8B).

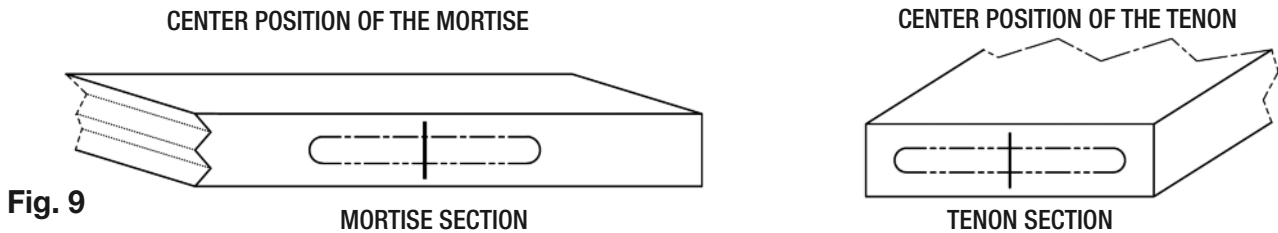
**Fig. 8A**  
6**Fig. 8B**

# OPERATING INSTRUCTIONS:

## 1. Marking Joint Centers and Location

Mark the stock with center marks at the positions for the length of the tenon and the mortise. These marks will be needed to center the tenon and the longitudinal position of the mortise on the stock. If you have correctly set the *Centering Wall* for the thickness of the stock, the stock will automatically be centered\*\* for stock thickness when clamped in the jig.

*\*\*Tip: if there is a variation in the thickness of the stock used, you may adjust for this by use of appropriate shims or by readjusting the Centering Bar.*



## 2. Centering the Stock

- Centering the stock in the jig is accomplished by adjusting the *Centering Wall* [4] (Fig.10) for the thickness of the stock.
- The jig will handle stock with a thickness between 1/2" and 1-1/2".
- Using the lumber industry's nomenclature, these two thicknesses, designated as, "2 quarter" (1/2") and "6 quarter" (1-1/2"), indicating the number of 1/4" increments of thickness.
- The markings are on the tenon end of the *Centering Wall* [4A]. Use these "quarter" units to adjust for the thickness of your stock in "quarters". For example: if you are using 3/4" (three quarter) stock, align the number "3" with the inner wall of the jig (Fig. 11), and the stock will be at its nominal center in the templates.
- When adjusting the *Centering Wall*, and to maintain parallel alignment, always make sure the bar is correctly seated on the jig body with its serrated matching surface [4B] (Fig.11) in the jig.

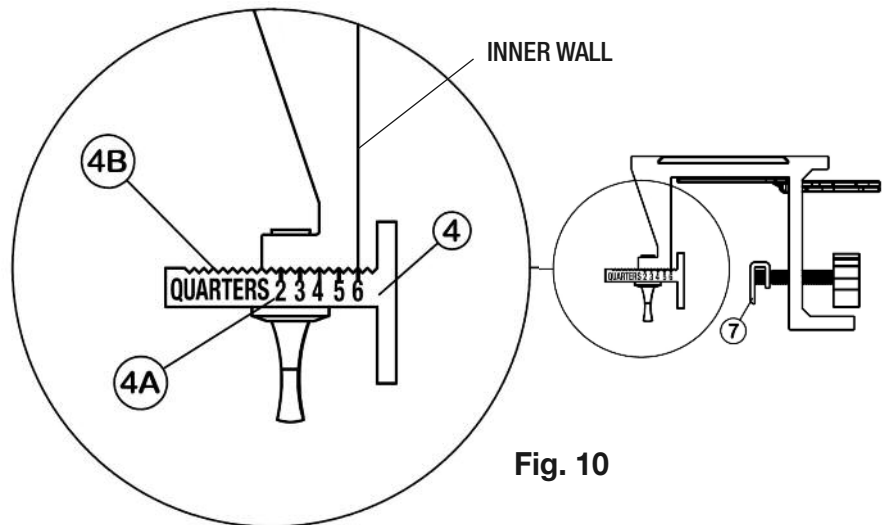


Fig. 10

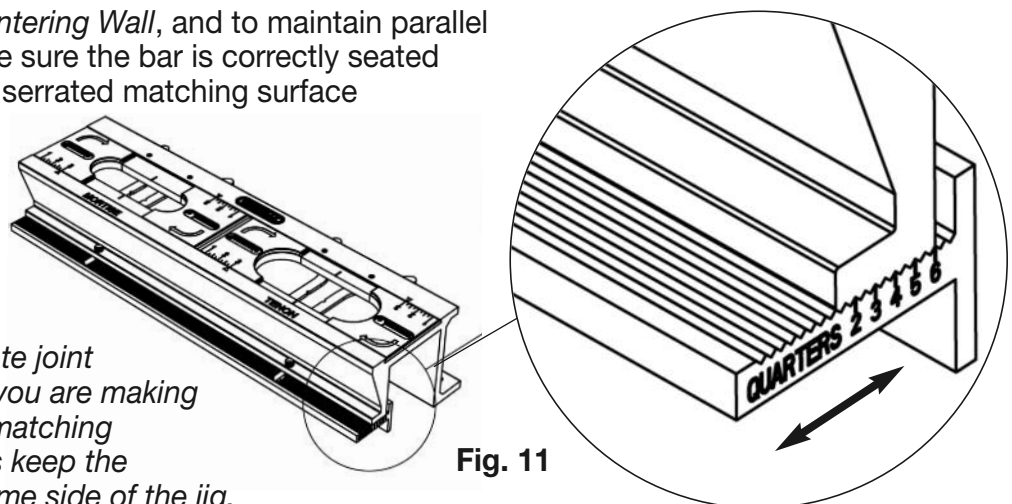


Fig. 11

*Tips: to assure an accurate joint alignment, particularly if you are making a Face Frame or similar matching surface type joint, always keep the matching faces to the same side of the jig.*

### 3. Positioning the Stock Using the Positioning Bars

When in the deployed position (Fig 12), the *Positioning Bars* serve two basic purposes:

1. Then position the stock at the correct depth below the underside of the template for routing
2. Then align the stock so it is squared, at 90 degrees, to the jig longitudinally

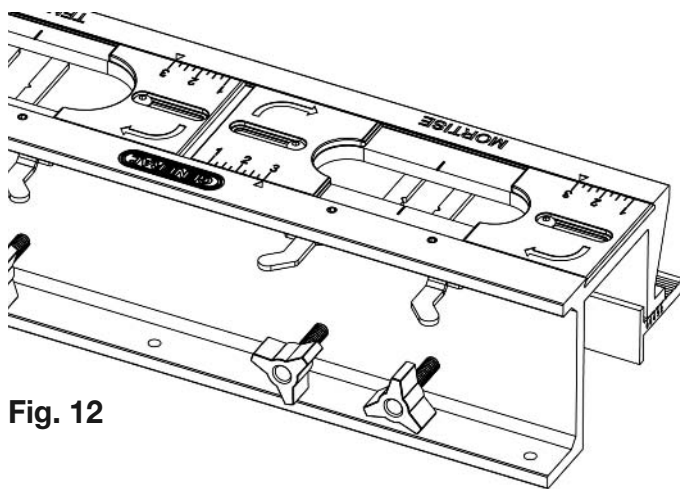


Fig. 12

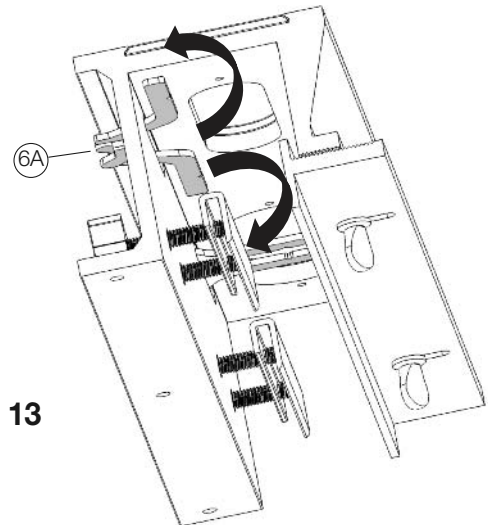


Fig. 13

The *Positioning Bars* [Fig 12 and 13] are stored along the inside edge of the underside of the jig's top when routing.

1. To extend the bars, use the *Positioning Bar handles* [6A], located under the outside top edge.
2. After you fully deploy the *Positioning Bars*, you're ready to place the stock in the jig. Insert the stock gently up against the deployed *Positioning Bars* (Fig. 14) and tighten the *Thumb Screws* [5] just enough so the stock is held loosely by the *Face Clamps* [7].

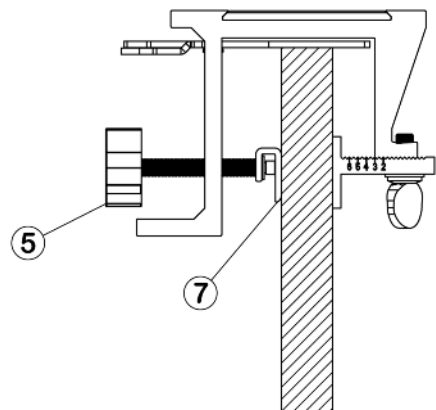


Fig. 14

3. Center the stock longitudinally using the jig's *Centering Marks* [1A] on the jig (Fig. 15). Before tightening the *Face Clamps*, be sure the stock is flat and square against the *Positioning Bars* (but not too tight), and correctly centered.
4. Tighten the *Face Clamps*, enough to secure the stock from moving.
5. Using their handles, return the *Positioning Bars* to their storage position (Fig15).

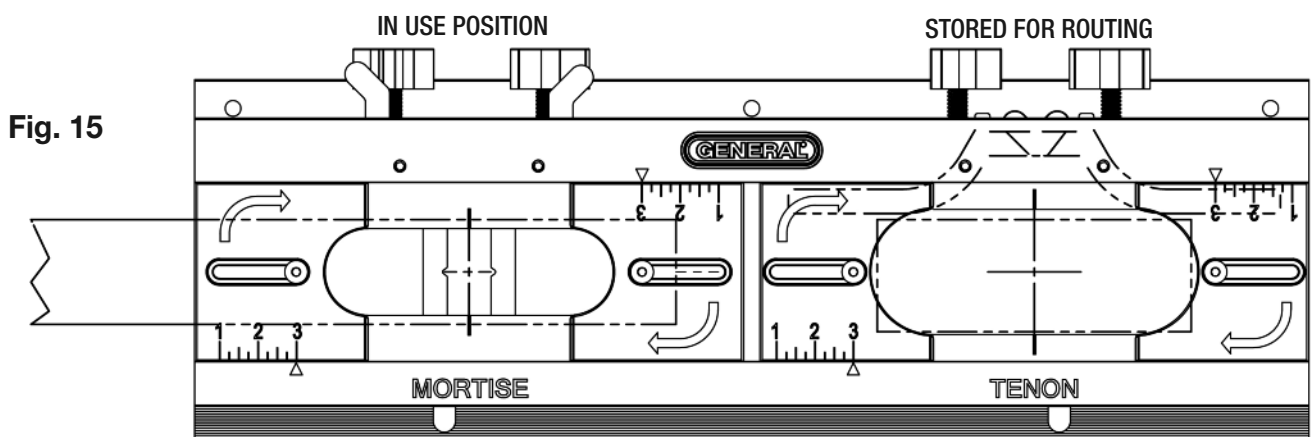


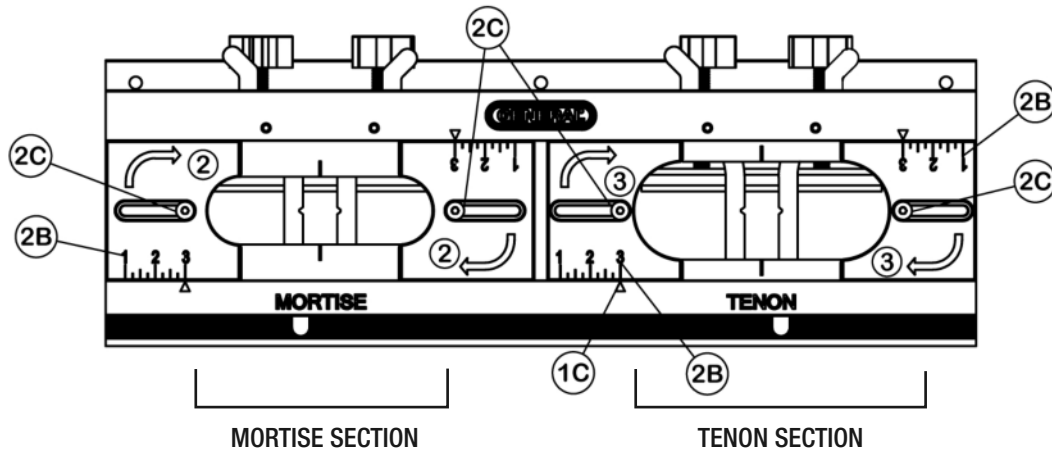
Fig. 15



## 4. Setting the Joint Length

The **M&T jig** has two working sections, the mortise section and the tenon section (Fig. 16).

Fig. 16



Both the mortise section and the tenon section of the jig are equipped with left and right Adjustable Sliding Templates [#2 & #3] (Fig.16) that are used to set the length of the joint. Visible are the numbers 1, 2 and 3 along with associated ruled markings on each template's edge [2B].

**To adjust the templates for the desired joint length**, loosen the Lock Screws [2C] on the right and left templates on both sides of each joint and slide them to the desired opening indication (as referred to in the chart based on your bit diameter). All four (4) sliding templates should be at the same setting. Re-tighten the screws.

**The numbers 1, 2 and 3 on the adjustable sliding templates directly correlate to the 3/8" bit reference in the chart that follows.** For example, if you set the template positions to #2 you will create a 2" long joint. Set the templates to #1 and you'll create a 1" long joint.

If you're using a 1/4" or 1/2" diameter bit, refer to the settings in the chart for the actual size of the joint at these same markings. The chart compensates for the difference in bushing size and bit diameter from a 3/8" bit. For example, using a 1/4" bit with the templates positioned at #2 would produce a joint that is 1-7/8" long. Similarly, using a 1/2" bit with the templates at the #2 position would produce a 2-1/8" long joint.

### Notes:

- The chart below indicates the exact length of each joint for each marking on the template and for each bit size.**
- When you set the size of the opening, make sure that ALL of the templates indicate the same measurement; this assures that both the mortise and the tenon will be the same size. (Fig. 16)**

### Length of Mortise and Tenon Chart

Joint Thickness	Template Position Markings								
	3	2-3/4	2-1/2	2-1/4	2	1-3/4	1-1/2	1-1/4	1
1/4"	2-7/8	2-5/8	2-3/8	2-1/8	1-7/8	1-5/8	1-3/8	1-1/8	7/8
3/8"	3	2-3/4	2-1/2	2-1/4	2	1-3/4	1-1/2	1-1/4	1
1/2"	3-1/8	2-7/8	2-5/8	2-3/8	2-1/8	1-7/8	1-5/8	1-3/8	1-1/8

Both the tenon and mortise sections have two *Centering Marks* [1A] (Fig. 17) which indicate the longitudinal center of the templates. There are also *Centering Notches* [1B] on the deployed *Positioning Bars* [6]; they indicate the center of the template's width.

*TIP: It may be advisable to size the mortise slightly longer than the tenon (or the tenon slightly shorter than the mortise) for ease of insertion, adjustment and gluing.*

Fig. 17

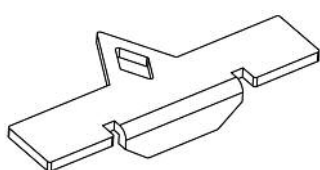
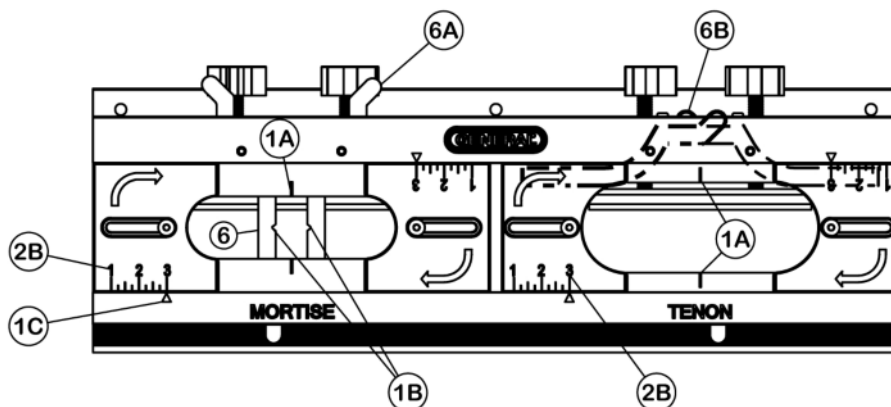
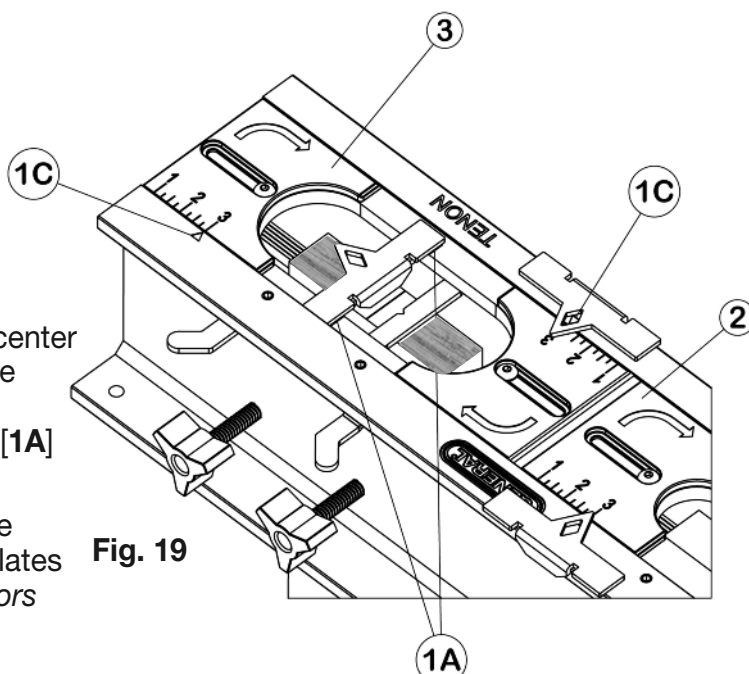


Fig. 18

The *Alignment Tool* (Fig. 18) is used to help center the uncut wood in the jig. Before securing the wood in the jig, place the *Alignment Tool* as shown and align it with the *Centering Marks* [1A] on the jig (Fig. 19).

The *Alignment Tool* can also be used to more accurately align the *Adjustable Sliding Templates* [#2 & #3] to the *Template Positioning Indicators* [1C].

Fig. 19



### 5. Set the Depth of the Router Bit (See also "Setting the Cutting Depth" on page 6)

To set the "plunge" depth of the router (Fig. 20) and subsequently the cutting depth of the bit, remember to add 1/2" to the desired depth of the joint. Therefore, if you're setting the joint depth to be 1" then your measurement would be a total of 1-1/2" from the face of the base plate to the tip of the bit.

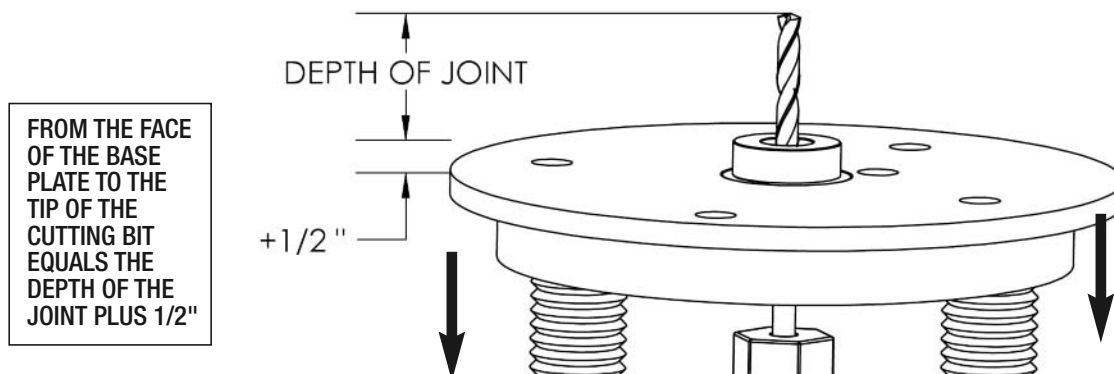


Fig. 20

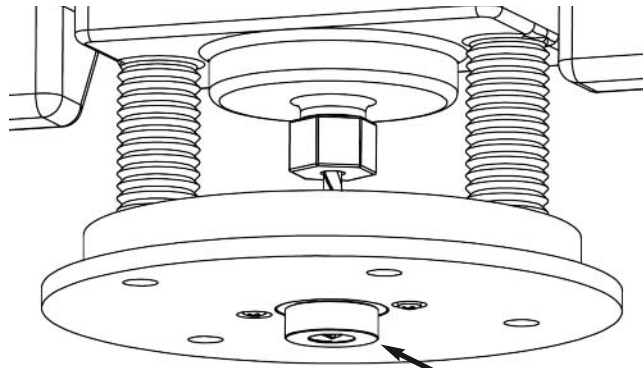
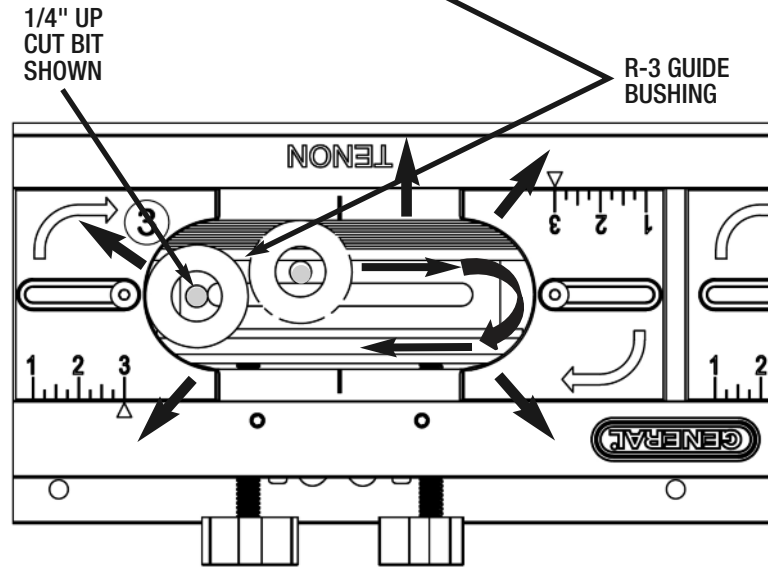


Fig. 21

## 6. Routing the Tenon

When routing the tenon, make sure the *Guide Bushing [R-3]* only rides against the outer edges of the tenon template [3] (Fig. 21) at all times.

1. Start the cut by putting the guide bushing into the end of the template.
2. With the *Guide Bushing* in the end of the template and the router base squarely on the jig surface, turn the router on.
3. Plunge the router to a workable depth and guide the router bit clockwise through the cutting process making sure to keep the *Guide Bushing* tight to the outer edge at all times.



**NOTE:** You can make successive plunges to any depth while moving the *Guide Bushing* clockwise around the tenon template always riding against the edge to make the cleanest joint possible. We recommend making successive shallow plunges and cutting sweeps to avoid over stressing the cutting bit. (Fig. 21 & 22)

*Caution:* before retracting the router bit from the cut, be sure to turn the router off.

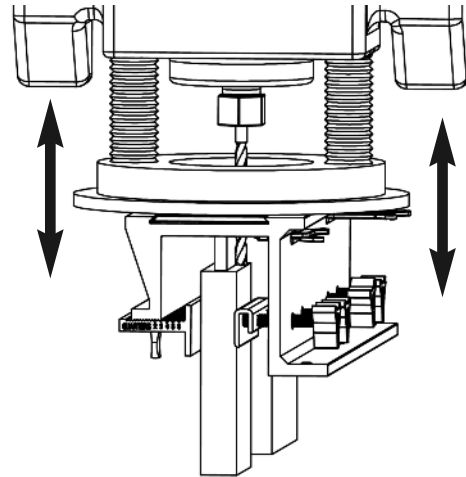


Fig. 22

*Tip:* depending on the actual thickness of your stock, you may at times get a "fence" or "flash" around the edge of your tenon (Fig 23). Be sure to cut, file or sand it off cleanly to ensure a tight fit.

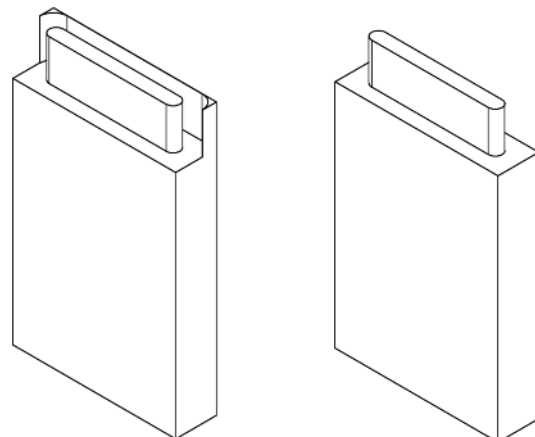


Fig. 23

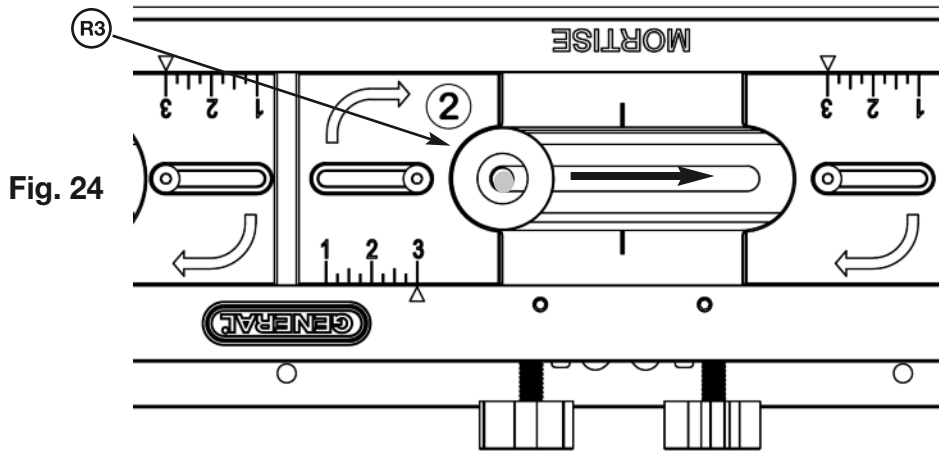


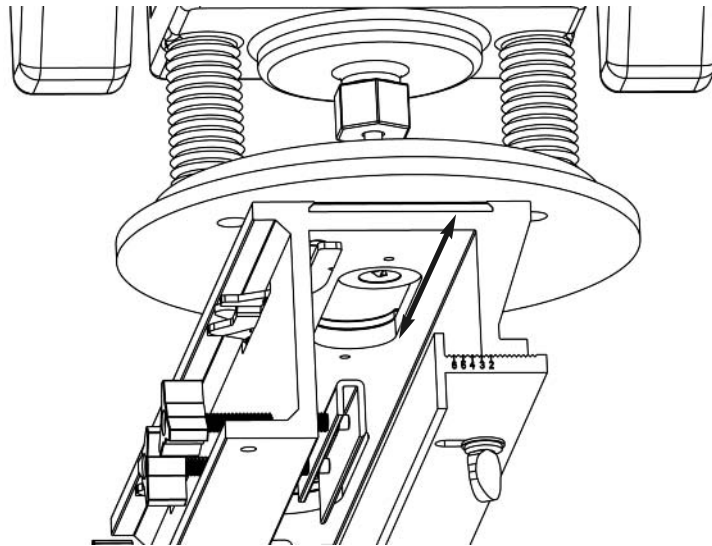
Fig. 24

## 7. Routing the Mortise

*Tip: when routing the mortise, it is advisable to increase the depth of cut slightly more than that of the tenon to allow space for glue to be put on the tenon before inserting it into the mortise.*

The *Guide Bushing [R-3]* fits the *Mortise Template [2]* (Fig. 24) exactly to prevent it from wandering out of line. It will be used for all mortises regardless of size.

Fig. 25



1. Before turning on the router, place the *Guide Bushing* in the end of the mortise template and slide it through the template to be sure it moves freely. (Fig. 25)
2. With the *Guide Bushing* in the end of the template and the router base squarely on the jig surface, turn the router on.
3. Plunge the router and guide the router bit through the cutting process.

**NOTE:** We recommend cutting the mortise in successive overlapping plunges to depth and then repeatedly move the bit back and forth to clean up the mortise slot.

## ROUTING OTHER SIZE MORTISE AND TENONS

The **E•Z Pro Mortise and Router Guide Bushing Tenon Jig Kit** includes the guide sleeve with *Locking Nut* [R2, R1], a 1-1/8" *Router Guide Bushing* for 1/4" joints [R3], a 1/4" *Upcut Spiral Router Bit* and a *Centering Pin* [R4]. These parts will permit you to make 1/4" mortises and tenons suitable for 3/4" thick board (Fig 26). The kit also includes the *Guide Bushing* you will need to make mortises and tenons of 1/2" [R7] or 3/8" [R6] (Page 4), however, you will need to make a separate purchase of the corresponding *Upcut Spiral Bits*. Please see sizing chart on Page 10.

- To make a 3/8" tenon, you'll need a 3/8" *Upcut Spiral Bit* and the 7/8" *Guide Bushing* [R6].
- To make the matching 3/8" mortise, change to the 1-1/8" *Guide Sleeve* [R-3]. (Fig. 27)
- To make a 1/2" tenon, you'll need a 1/2" *Upcut Spiral Bit* and the 5/8" *Guide Bushing* [R7].
- To make the matching 1/2" mortise, change to the 1-1/8" *Guide Sleeve* [R-3]. (Fig. 28)

**NOTE:** *Guide Bushings* can be changed without removing router bit.

Fig. 26

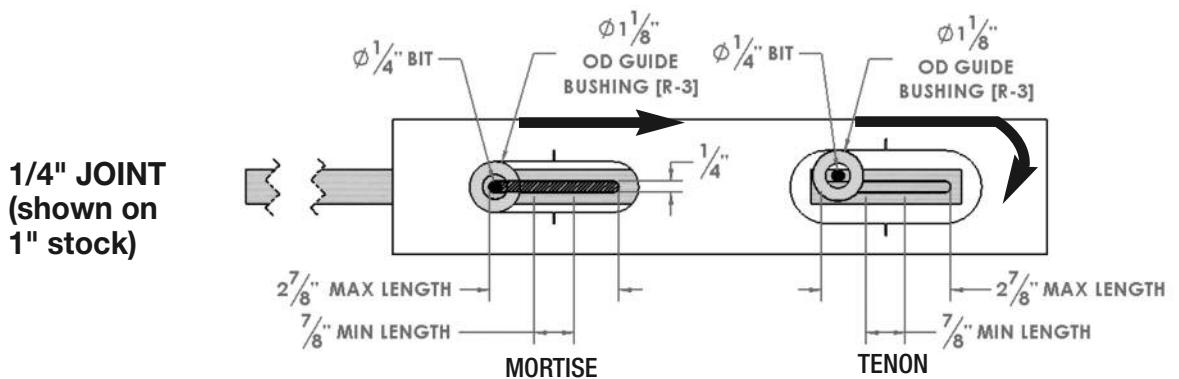


Fig. 27

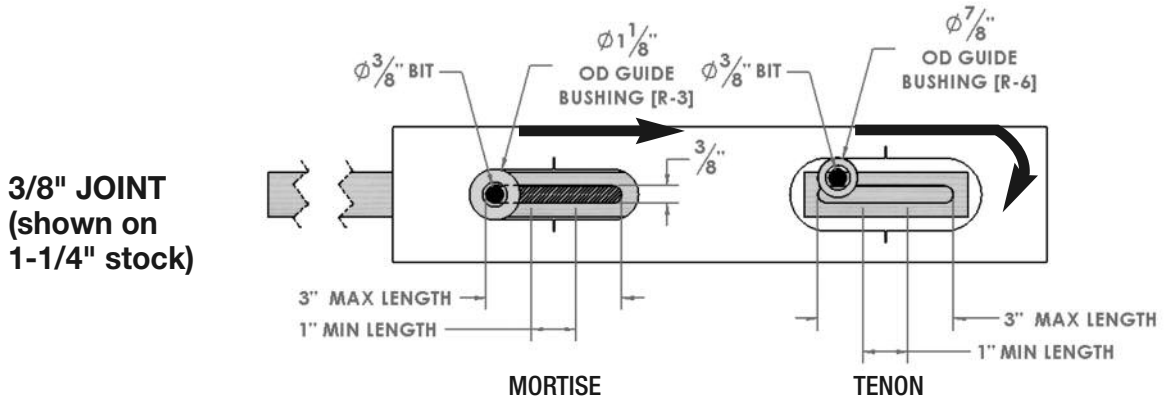
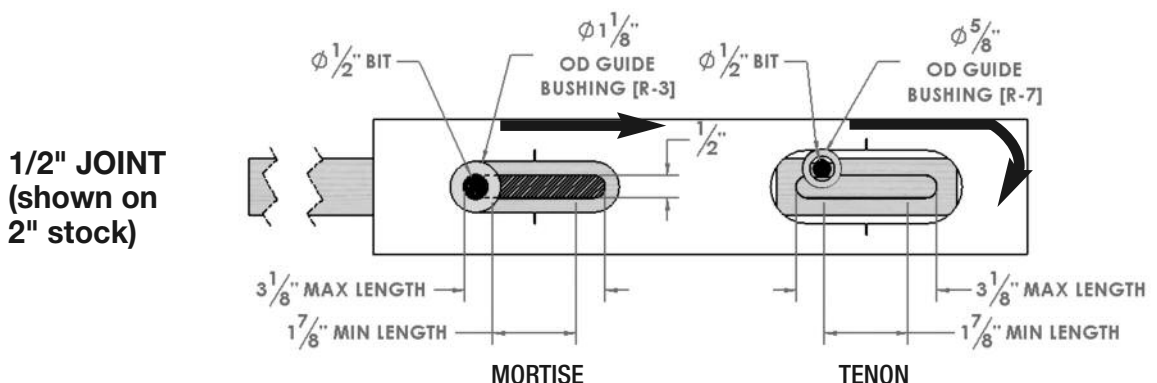


Fig. 28



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## **WARRANTY INFORMATION**

The **No. 870 Mortise & Tenon Jig Kit** from General Tools & Instruments is warranted to the original purchaser to be free from defects in material and workmanship for a period of one year. Subject to certain restrictions, General will repair or replace this product, if, after examination, it is determined by General to be defective in material or workmanship.