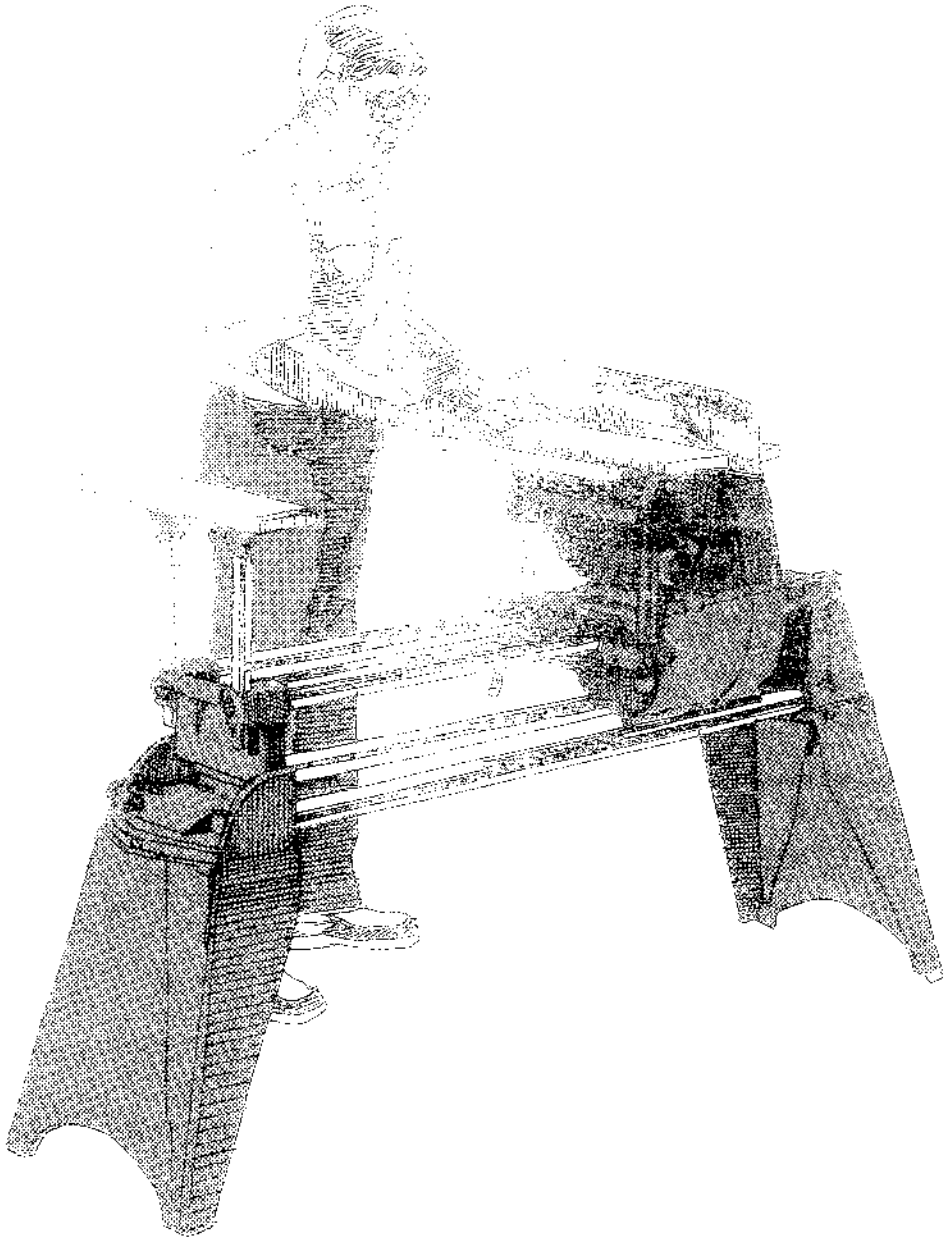
THE SHOPSMITH® MARK V HOME WORKSHOP SYSTEM



Shopsmith Inc.
3931 Image Drive
Dayton, Ohio 45414

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SELF STUDY COURSE CROSS-REFERENCE...

...between the "Revised" edition of Power Tool Woodworking for Everyone, and the newest "4th" edition. Keep this sheet next to you as you go through the Shopsmith Woodworking Self Study Course. This cross-reference sheet allows you to use the updated, expanded book as you work your way through the lessons.

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INTRODUCTION

This self-study course has been designed to familiarize the new Shopsmith Mark V owner with the basic knowledge and woodworking skills necessary to be able to fully appreciate and utilize the SHOPSMITH MARK V HOME WORKSHOP SYSTEM.

The text for this course is *Power Tool Woodworking for Everyone* by R. J. DeCristoforo. This book will prove invaluable to the Mark V owner both in the utilization of this course and for many more advanced woodworking applications. Also, there are many references in this course to the Shopsmith Mark V Owner's Manual, a copy of which is included with all new Shopsmith Mark V's or can be purchased seperately.

WARNING: Read and understand the Shopsmith Mark V Owner's Manual, particularly the Safety Section, before attempting procedures based on the Self Study Course for the Shopsmith Mark V Home Workshop System.

A WORD FROM THE AUTHOR

The work assignments or woodworking operations covered in these lessons represent, step by step, exactly what I have always tried to teach students in working with them face-to-face. Naturally, they are designed to train even the complete novice. Even though you may be a pretty experienced craftsman, I cannot urge you too strongly to perform all of the work assignments. See it through all the way so that you learn all operations on your own Mark V through experience. The reason for this is quite simple. All power tools differ somewhat in their operating characteristics. If you follow this entire course on your new Mark V, you will have mastered all of the basic woodworking operations and, at the same time, will have learned to handle your versatile new woodworking machine with complete facility and safety.

A WORD ABOUT THE AUTHOR

Until his death, Professor Benjamin W. Spaulding was truly the dean of America's woodworking teacher-instructors. When he designed and wrote this woodworking course, he was Professor Emeritus of Industrial Arts at San Jose State College with over 45 years experience in training many thousands of people to be not only just craftsmen but to be teachers of craftsmen.

We are proud to be able to bring you this instruction course written by Professor Spaulding specifically for the Mark V owner. To the best of our knowledge this is the first time an educational program of this magnitude has ever been attempted. Your woodworking lessons, representing a culmination of all of Professor Spaulding's experience, are the most complete and detailed woodworking course in existence. Study them carefully and follow the instructions.

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LESSON 1
ASSIGNMENT 1

HOW TO CHECK AND ALIGN YOUR SAW

DESCRIPTION:

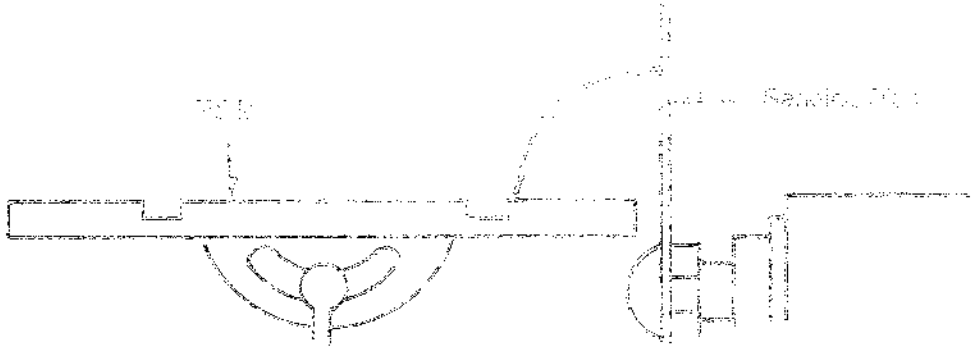
Any power tool is designed, in so far as possible, to supply all of the precision and all of the muscle required for the various operations. Therefore, the first thing to do is to "check out" your tool to be sure all important alignments and adjustments are correct. Only in this way can you be sure of performing accurate work.

WARNING: Read and understand the Band Saw Owner's Manual, paying particular attention to the Safety, General Information and Alignment and Adjustment sections.

In addition, study carefully the assembly pages (5 through 20) of the book you should try to learn the proper procedure for assembly as pertains to your band saw.

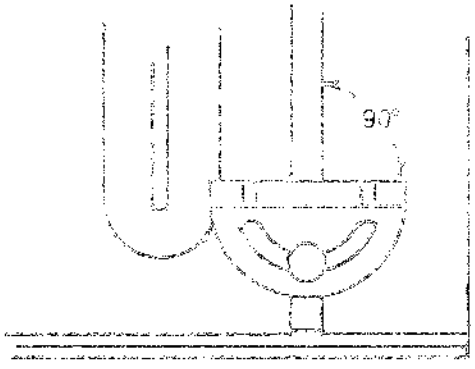
OPERATIONS:

1. Check to see that your table surface, (Table ... and Saw ...) is square to the saw blade (...



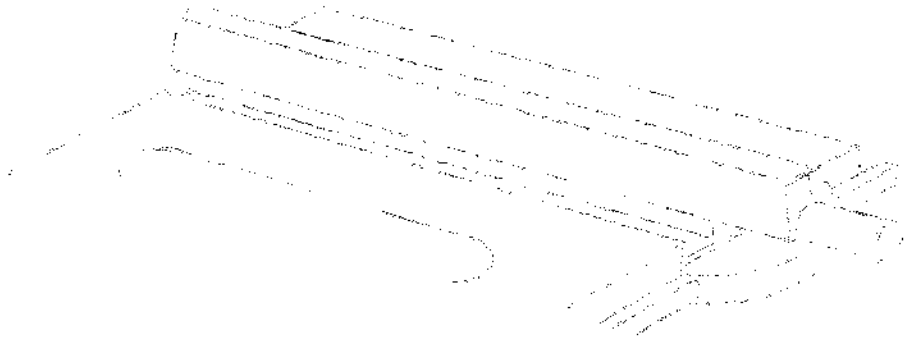
2. Check to be sure that the miter gauge slots in which the miter gauge bar slides are parallel to the sanding disc.

3. Check to see that the head of your miter gauge, when set at 90° is exactly at right angles to the miter gauge slots and/or sanding disc.

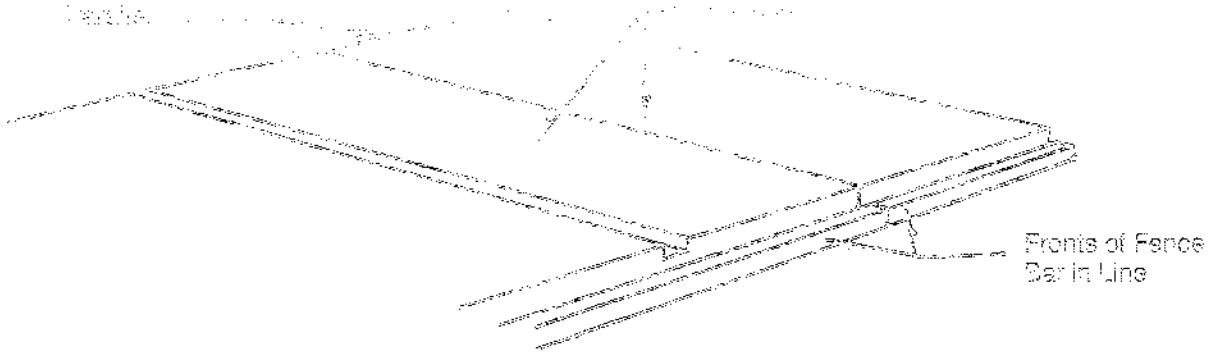


LESSON 1
ASSIGNMENT 1

4. Check to see that your rip fence, when locked to the table, is parallel to the miter gauge slots and/or sanding disc.



5. Check to be sure that your blade is parallel to the saw table and that the front of the fence bar is in line with the front of the miter gauge slot.

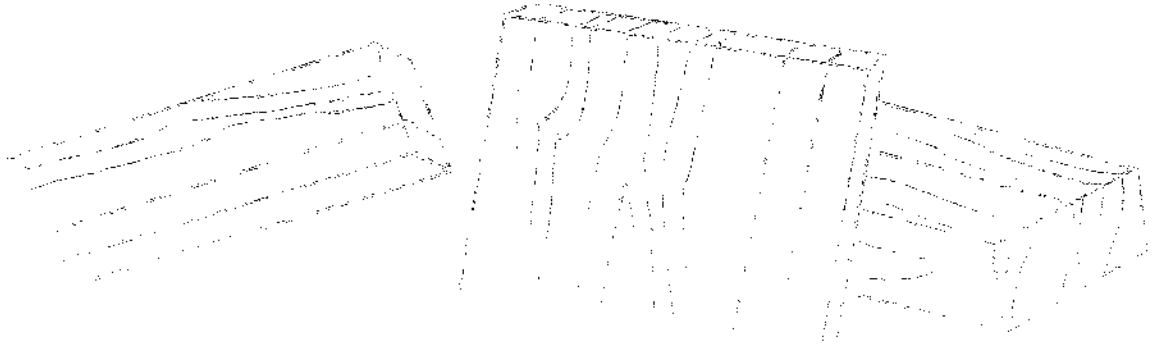


When all of these points have been checked and any necessary adjustments made, your saw will give you true, accurate cuts. As is true of any piece of machinery, adjustments can slip slightly after many hours of use. It is wise to recheck all of these points after each 24 hours of actual use.

LESSON 1
ASSIGNMENT 2

HOW TO RIP LUMBER

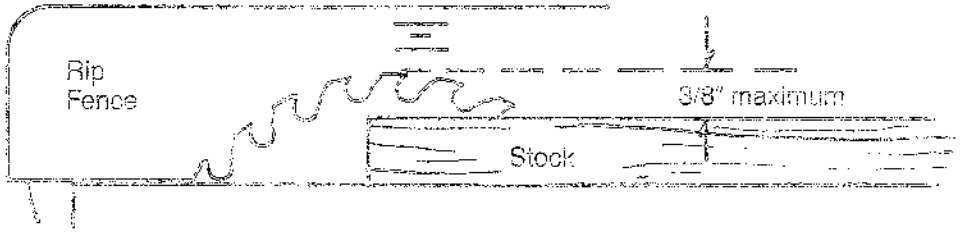
DESCRIPTION:
Ripping (the popular contraction of rip sawing) is the sawing of lumber with the grain of the wood. This is normally referred to as the long way of the stock. The function of ripping is to reduce a given piece of stock to the desired width to be used in constructing a project. Ripping is one of the most basic woodworking operations. Normally lumber is available only in widths that increase in increments of two inches. This dimension is usually the size of the stock before it was dressed smooth. For this reason, it is extremely helpful to the craftsman to be able to reduce the stock to exactly the width desired. This also removes the limitation of designing all projects to fit only the stock widths of lumber.



PROCEDURE:
1. Select a piece of stock [illegible] long. Use any lumber such as pine.

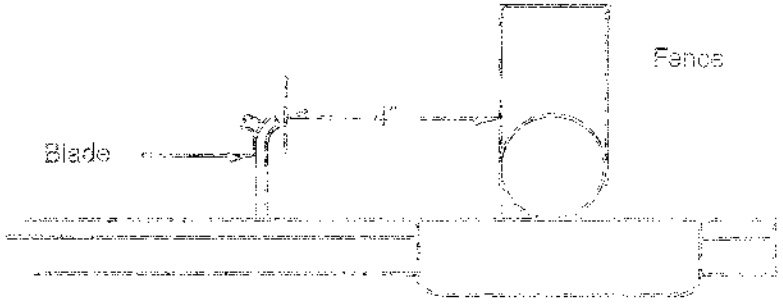
WARNING: The stock should not be warped. Warped stock will bind and kickback.

2. Put saw blade on saw arbor. See Owner's Manual if you need help.
3. Lower or raise the table until the saw blade projects 1/4" to 3/8" above the thickness of the stock (in this case 1" to 1-1/8").

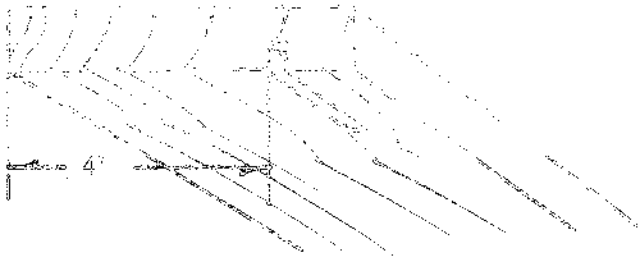


LESSON 1
ASSIGNMENT 2

4. Adjust the rip fence so that it is very close to 4" from the point of a tooth bent toward the fence.



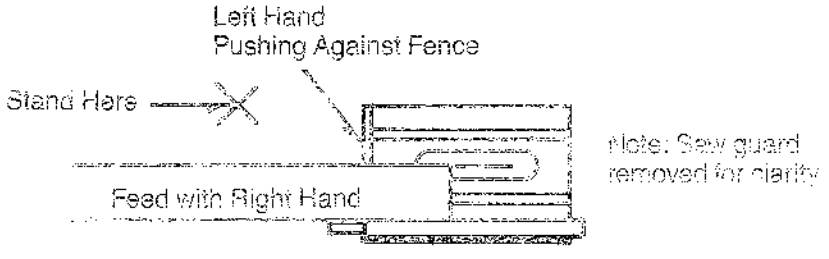
5. Lock the fence firmly in place.
6. Using the quill feed, move the blade so it is exactly 4" from the fence and lock the blade securely.
7. Start the saw, set the speed dial for sawing and make short trial cut on scrap stock. You need only notch the end sufficiently to permit measurement. Turn off machine and let it come to a complete stop and then measure cut.



8. If not correct, readjust blade to exact width.
9. Select the edge of the board that is straight.

   Note: A crooked edge may cause binding. Also, do not use a board that is warped or has a wind (twist) in it for this first operation.

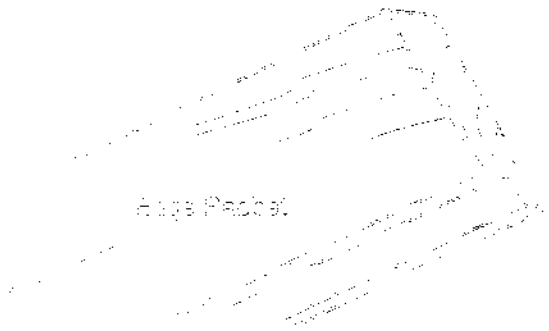
10. Start saw.
11. Place edge of board against rip fence standing to left of the line of saw cut.



ASSIGNMENT 5

HOW TO CUT REBATES

A rebate is a step-shaped groove in the edge or end of a piece of stock. It is used to form several types of joints—edge and end.

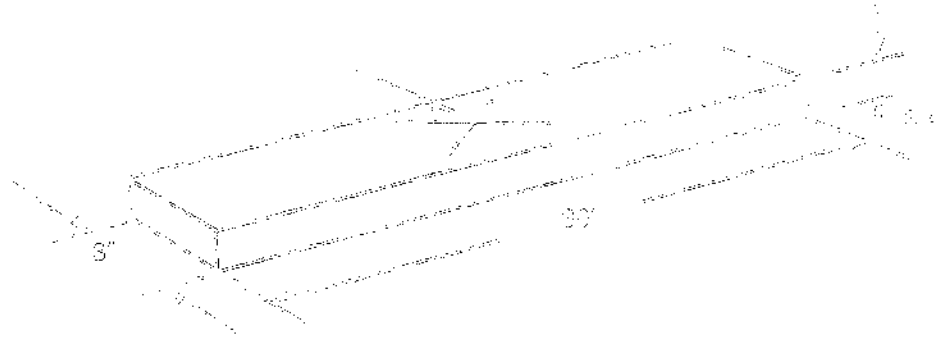


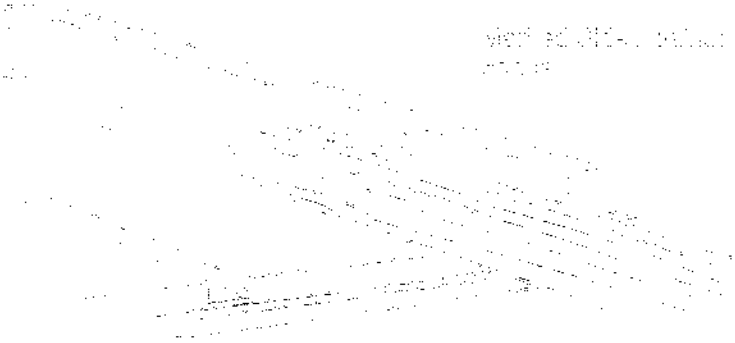
One of these is the rebate-butt joint. (See illustration on page 18 of textbook.)

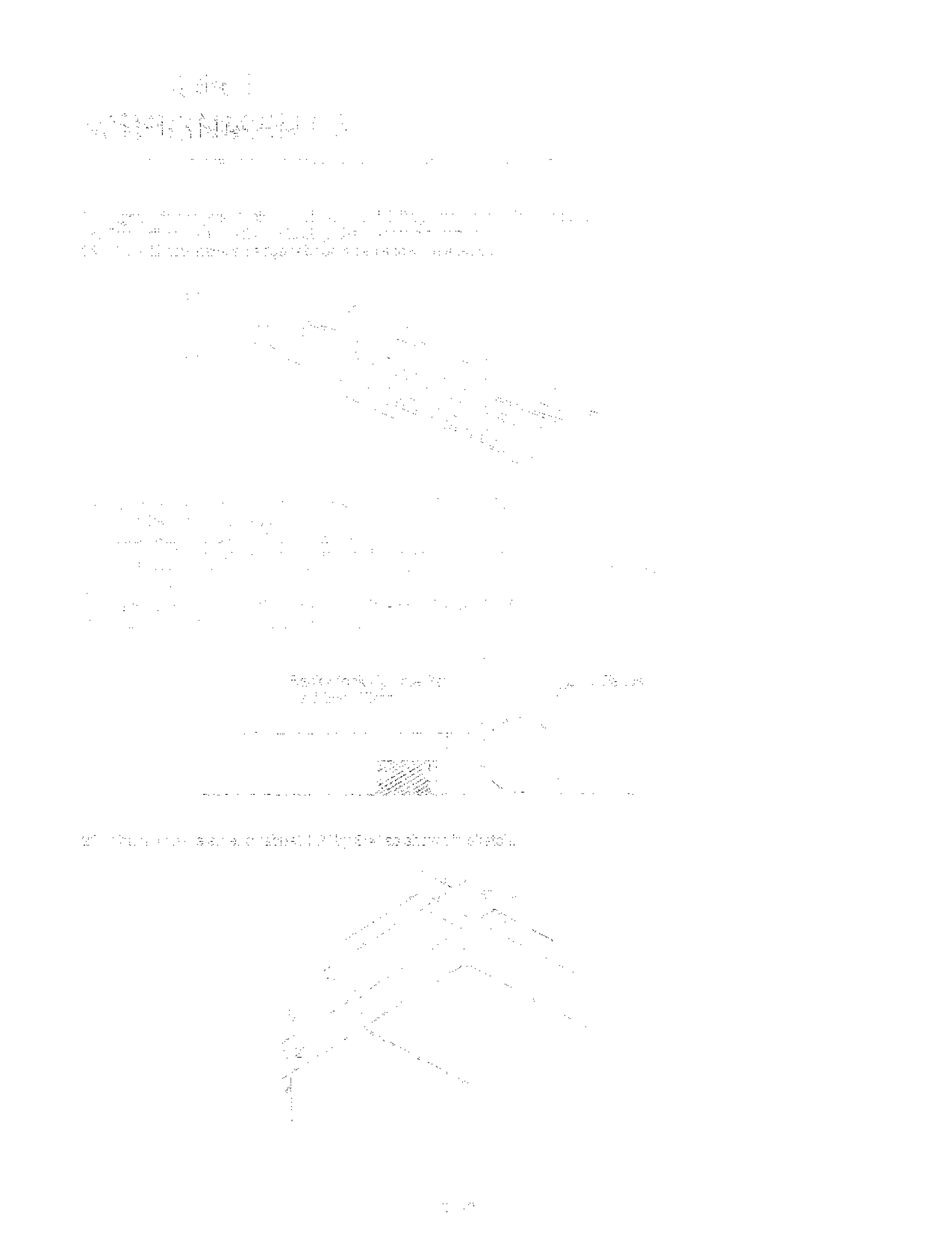
REMEMBER

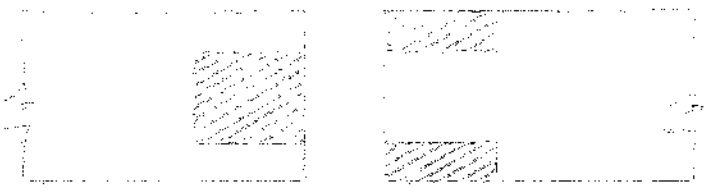
WARNING: When cutting rebates, it is necessary to remove the guard. Be sure that you replace the proper saw guard, keep your hands away from the saw, and use a push stick.

1. Measure a piece of stock 3/4" by 6" by 30".
2. Select and mark one of the flat surfaces. Mark one face for reference.










2 1/2"
Stock

ASSIGNMENT 6

1. Turn in your sketch and/or end and make out mark other side.
2. Drop back and [illegible] program [illegible] Program.
3. Make repeating cuts turning stock end for end each time.

[illegible]

[illegible]

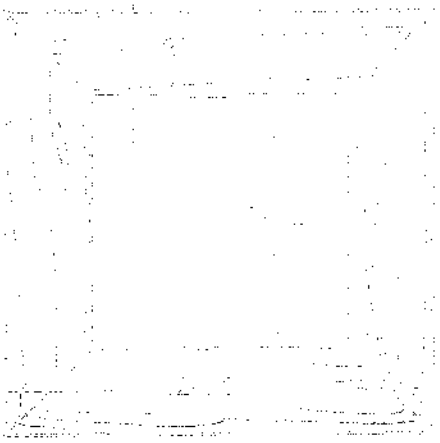
[illegible]

[illegible]

[illegible]

[illegible]

3. [illegible]
4. [illegible]
5. Place left hand on work material to the left of the saw blade with fingers pointing [illegible] beyond the saw blade.
6. Holding firmly, make cut slowly.
7. Turn off saw, wait for blade to stop and remove scrap piece.
8. [illegible]



ASSIGNMENT

LESSON 2

INTRODUCTION

[illegible]

[illegible] the table saw chapter of your textbook and your Owner's [illegible] in Lesson 1 you have learned the most basic saw operations and the [illegible]

[illegible] as we did in the first lesson. You are [illegible] whether they are spelled out or not.

[illegible] Self Study course for the Shopsmith [illegible]

[illegible] they learn.

[illegible] square ends [illegible] edges and [illegible] and use [illegible]

[illegible]

[illegible]

[illegible]

[illegible] designated distance from blade and use [illegible] feed [illegible] setting.

[illegible] the designated degree number to the right of [illegible] locked.

Note: When tilting the saw table, use the quill feed to keep the saw blade centered in the insert slot while tilting.

Set Depth [illegible] on the table saw. You merely unlock the depth lock, set [illegible] reaches the pointer the quill is stopped.

[illegible] saw blade [illegible] toward the pencil mark being used or away from the point of measurement (such as rip fence).

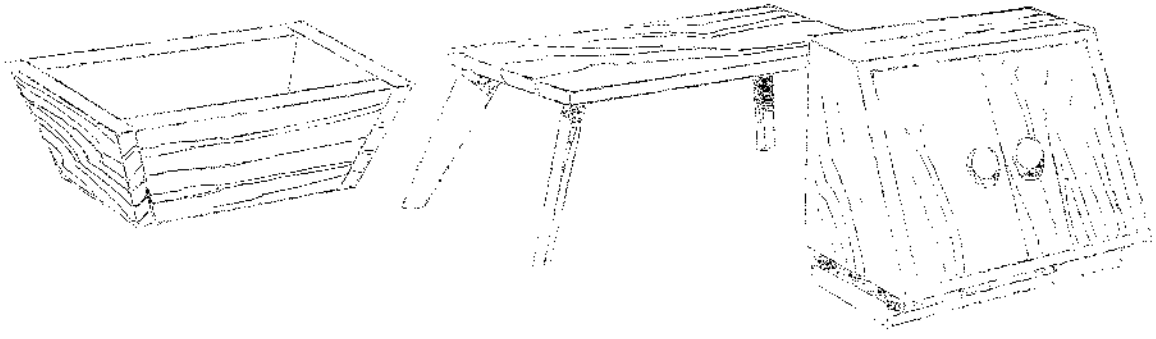
[illegible] bent toward the point of measurement (such as rip fence [illegible] is always the tip of tooth bent toward miter gauge.

LESSON 2
ASSIGNMENT 8

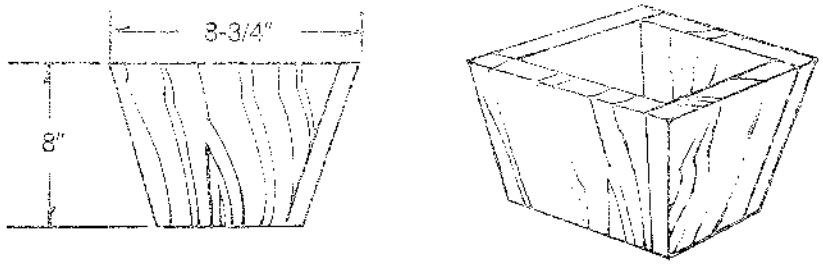
HOW TO CROSSCUT TAPERS ON FLAT BOARDS

DESCRIPTION:
Taper cutting is reducing stock by making a continuous straight cut which produces progressive variation in width. Taper cuts in small stock can be made with only miter gauge support.

USE:
Taper cuts in flat boards are used in planter boxes, window boxes, waste baskets, and similar objects that have top and bottoms of unequal size. Long taper cuts requiring the use of a tapered jig are frequently used on table legs and other pedestals. Taper cuts on one side only are often used to form a planning front to cabinets and shelves.



OPERATION:
Let us make a flower box approximately 8" square at the top and 8" high with tapered sides.



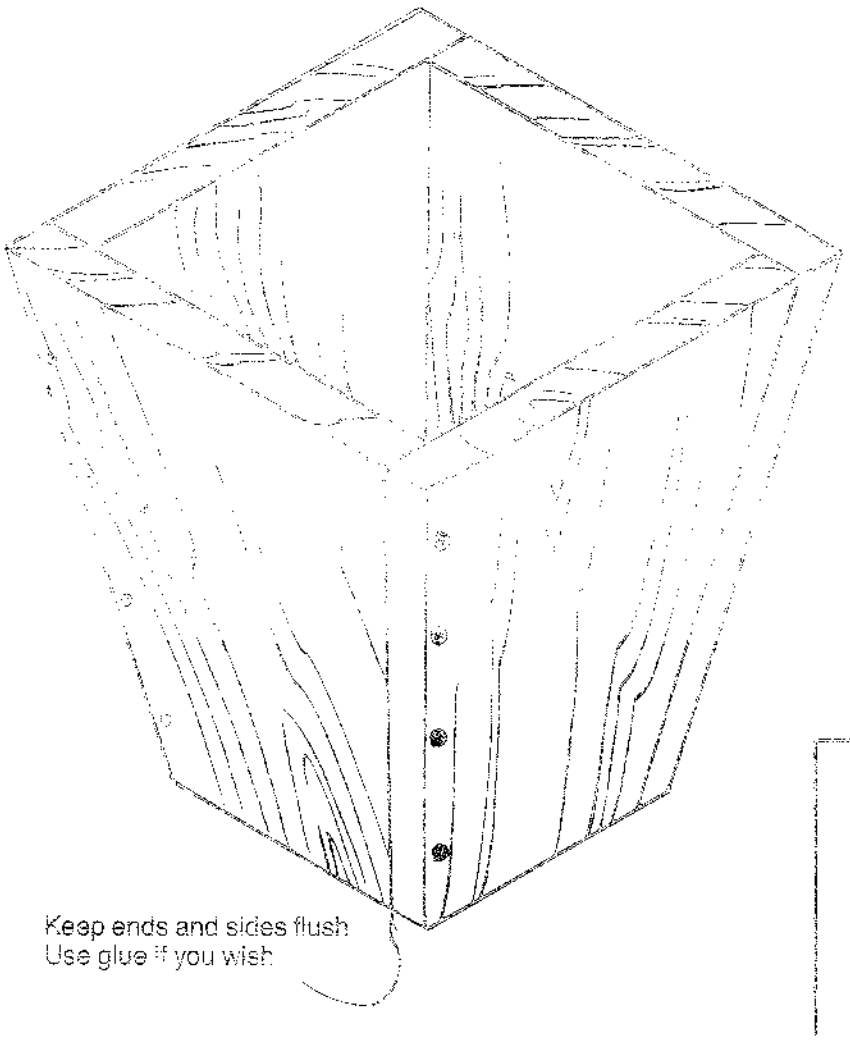
1. Prepare a board (redwood if you have it) 3/4" × 8" × 36".
2. Crosscut stock into 4 pieces 8" long.
3. Set miter gauge at 85° left.

Note: This will be 5° off the right angle. If a greater taper is desired the angle should be increased.

4. Place miter gauge in right table slot.
5. Pull miter gauge back until it clears the saw blade.
6. Place edge of stock against it and adjust so that the saw blade will finish cutting at the left bottom corner.
7. Make cut by holding the safety grip of the miter gauge with the left hand. Turn off machine and wait for it to come to complete stop before removing stock from gauge and returning gauge to front of table.
8. Turn stock over end for end and repeat cut on opposite end.

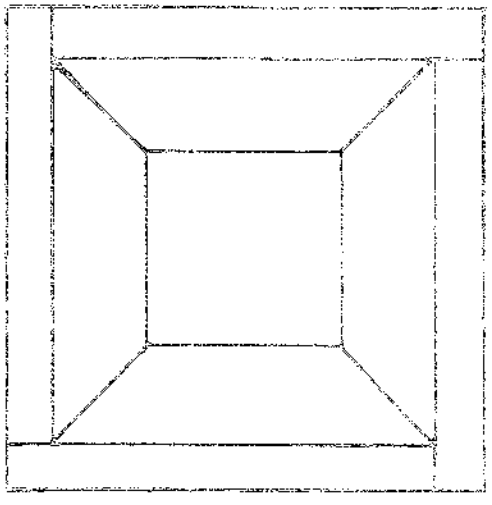
8. Repeat both cuts on remaining 3 pieces.
10. When nailed together as shown the project will resemble sketch on this page.

Note: We will make bottom in later assignment.



Keep ends and sides flush
Use glue if you wish

Top View of
Assembled
Planter



LESSON 2
ASSIGNMENT 9

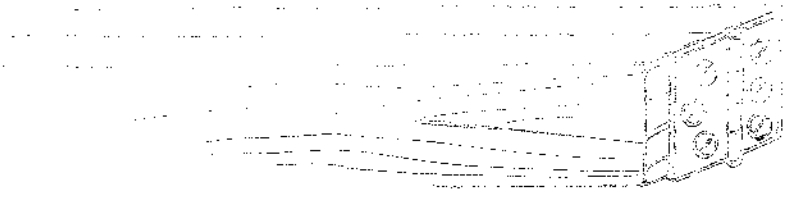
HOW TO MAKE A TAPERING JIG

DESCRIPTION:
This jig consists of two pieces of stock fastened together at one end with a hinge and adjustable at the other to various widths.

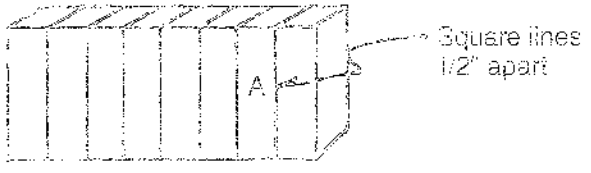
USE:
To assist the operator in making tapered cuts on long pieces of stock. If carefully made it will be useful to you for a long time and help you get more pleasure and production from your shop.

PREPARATION:
1. Prepare 2 pieces of stock 3/4" x 2-1/2" x 29-5/8"
2. Cut one piece 24" long. Save the small piece also.

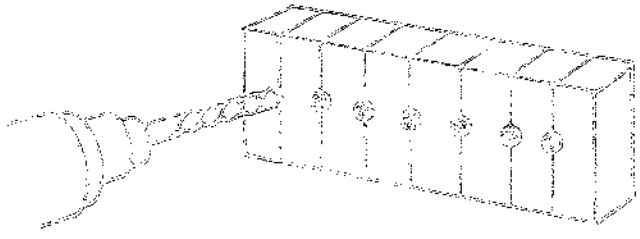
3. Fasten the pieces together with a hinge as shown in the illustration.



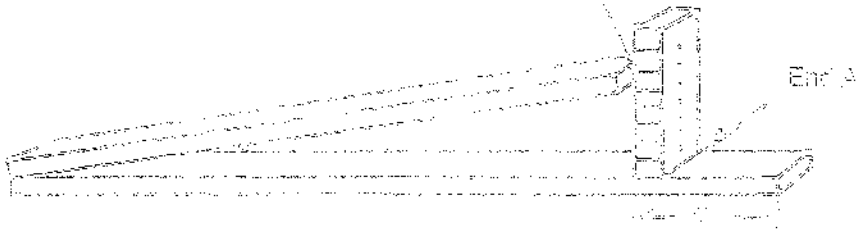
4. On one edge and one side of the 5-1/2" piece square pencil lines 1/2" apart starting at end A.



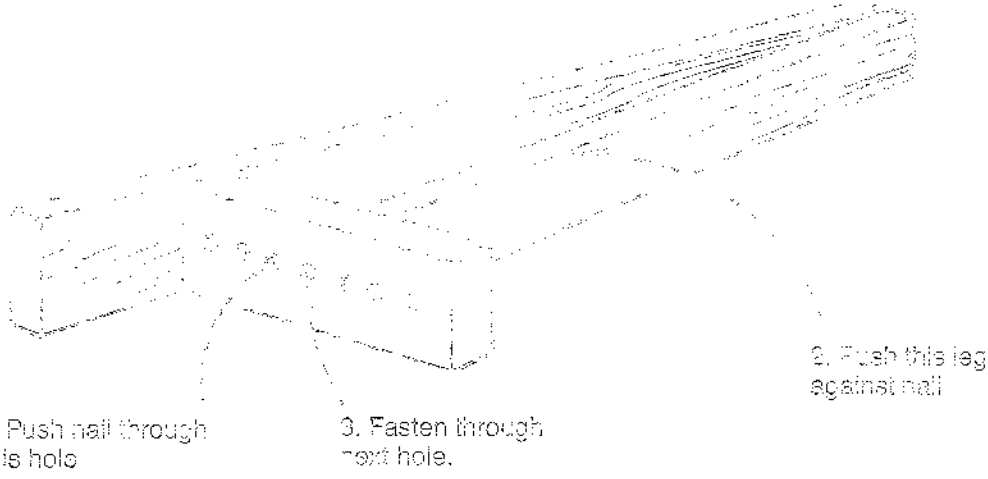
5. Locate center of each squared line on the marked side and drill through holes having diameters of a 6 penny common nail. (7/16" or 3/32")



8. Screw the end of the 6-1/2" brace perpendicular to the side of the end of the 24" piece with end A against 24" piece.



Note. Since hole spacing is 1/2" and adjustable leg of jig is 24" in length, the amount of taper per foot of run can be readily set. Determine required taper of 1-1/2" per foot. Example: Set nail or screw in 4th hole away from 28-1/2" leg of jig for a taper of 1-1/2" per foot. Set 24" leg against nail and fasten into end of 24" through 6th hole using nail or screw.



LESSON 2
ASSIGNMENT 10

HOW TO RIP LONG TAPERS ON FLAT BOARDS

DESCRIPTION:
Taper cutting on long boards requires the use of a jig because long stock will not fit the miter gauge. In addition, it is basically a rip cut.

USE:
Taper cuts are made in long stock (up to 24") for tall flower boxes, stools and cabinets. They are frequently needed for table legs and other supports. Tapers on one side only will give a slanting front to cabinets.

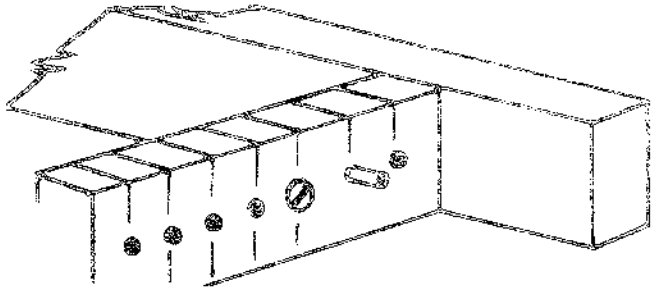
OPERATIONS:

1. Prepare 4 pieces of stock 3/4" × 8" × 16". (Redwood if you have it.)
2. There must be a specific amount of taper on each edge. In this case let us use 1-2" taper per foot.
3. Adjust saw blade to 1" height. Mount extension table on right.
4. Remove miter gauge and put rip fence on extension table.
5. Place tapering jig constructed in Operation 3 against rip fence.

Note: To make tapering jig slide easily apply paste wax to sides and bottom.

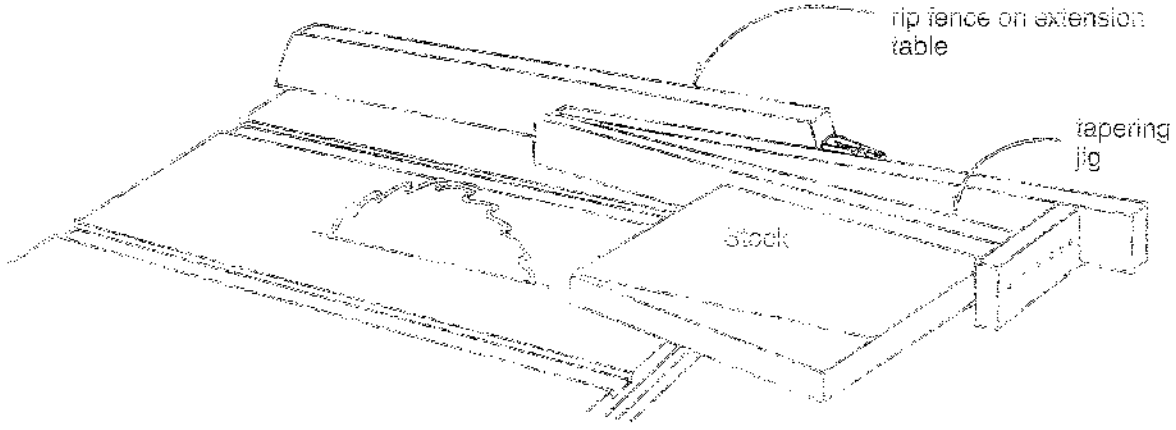
6. Slide headstock carriage and main table to right until main table is flush with or about 1/16" on extension table. Be sure both tables line up across top surfaces.
7. Set jig with nail in No. 2 hole and rest inner edge of 24" side against nail.
8. Nail in place with a 6 penny nail using next (No. 3) hole. (Or use #8 × 1-1/4" round head screw.)

Note: The nail need not be driven all the way in.

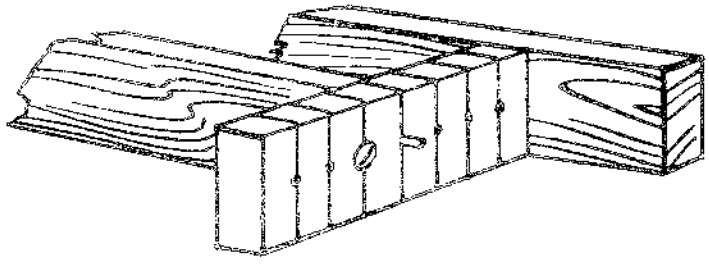


9. Place stock against the side of the jig and the protruding block.
10. Adjust rip fence and jig (using quill feed for final adjustment) so that the saw blade will start cutting on the front left corner.

Note: This is accomplished with both the jig and stock pulled forward until the front left corner is even with the inner tooth of the saw blade. A front table extension will be a great help.



11. Now with the right hand, grasp the jig where the short block is fastened to the long piece. (See page 62 of textbook.)
12. Start saw and make cut slowly, moving jig and stock simultaneously, being sure the stock is against the block and the jig at all times.
13. Continue on through after the cut is made, lifting up and clear, first the stock and then the jig.
14. Make similar cut on remaining pieces of stock.
15. Set jig as before with nail in No. 4 hole, then fasten.



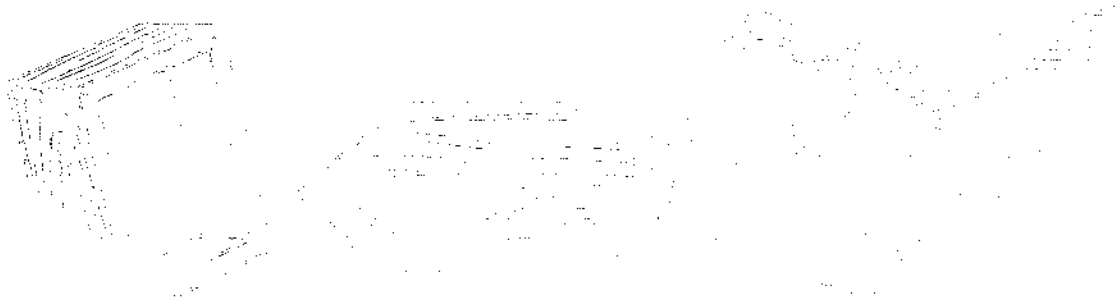
16. Turn stock over and cut tapers in opposite edges of the 4 pieces of stock.
17. Nail together. You now have a tall planter box. Assemble exactly as you did the small planter in Assignment 8.

Note: We will make bottom in later assignment.

LESSON 2
ASSIGNMENT 11

DESCRIPTION:
Beveling is cutting the [illegible] Cross bevels are called [illegible]

USES:
Bevels are cut on the ends of [illegible] Edge bevels are used [illegible] plywood to show only the [illegible] Both stock and bevels are [illegible] stock, either method might be used.



DEMONSTRATION:
[illegible]

First, make the bottom of one small planter, using the miter gauge. If you [illegible] stock, these dimensions will fit.

1. Prepare a board 3/4" x 5-15/16" x [illegible] (redwood, if [illegible])
2. Lock table carriage and headstock at extreme right end of [illegible].
3. Tilt saw table 5° to right of "0".
4. Adjust saw blade to 1-1/4" height.
5. Put miter gauge (set at 90°) in right slot.
6. Place edge of stock against miter gauge face and align bottom right front corner with inside [illegible].

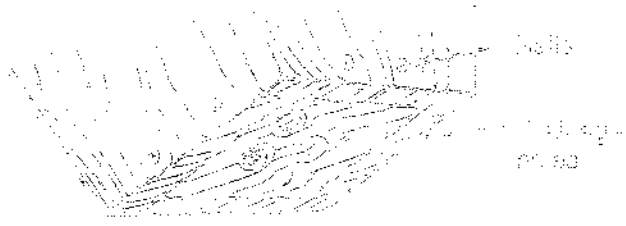
WARNING: Whenever the table is tilted, always check to be sure [illegible] turning on power.

7. Hold stock firmly in place, turn on saw and make cut.

WARNING: Turn off machine and let it come to a complete stop [illegible] Remove stock, then return empty miter gauge. Bevel cuts, like all [illegible] made smaller and safer with the miter gauge [illegible].

LESSON 2
ASSIGNMENT 11

3. Turn stock 90° and repeat Steps 2 and 3. Repeat until all four edges are chamfered.
4. Push bottom, smaller face down, through the top of the planter. It should fit smoothly and snug at the bottom. Fasten with small 8 penny nails through sides into edges of bottom. Drill a few holes in the bottom for water drainage.

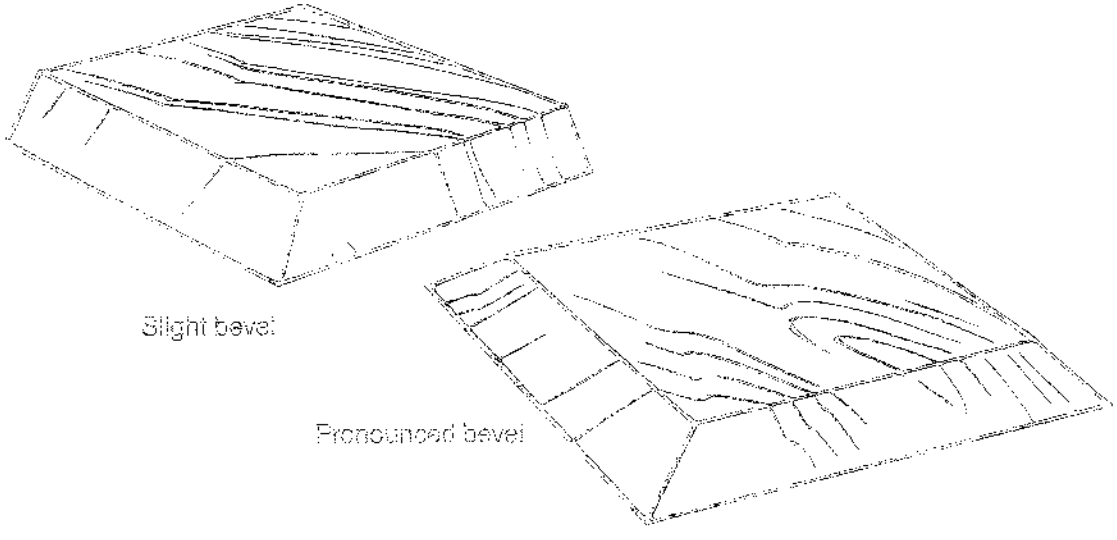


5. Prepare a piece of stock [illegible] 3/4" x 3/4" x 24".
6. Set [illegible] 3/4".
7. Set [illegible] 3/4".
8. Make [illegible] adjustments [illegible] true offcut.
9. [illegible] 3/4" [illegible] [illegible]

Note: Saw guard removed for clarity.

15. Turn on saw and make cut, using rip technique from Lesson 1. Do not return stock, but lift over to right of fence.
16. Turn stock 90° and repeat cut. Do this on remaining sides.
17. Install bottom in tail planter, just as you did in the small one.

Note. Both of these bevels were quite slight. Naturally, a steeper angle to the table would give a more pronounced bevel but the operations are the same.



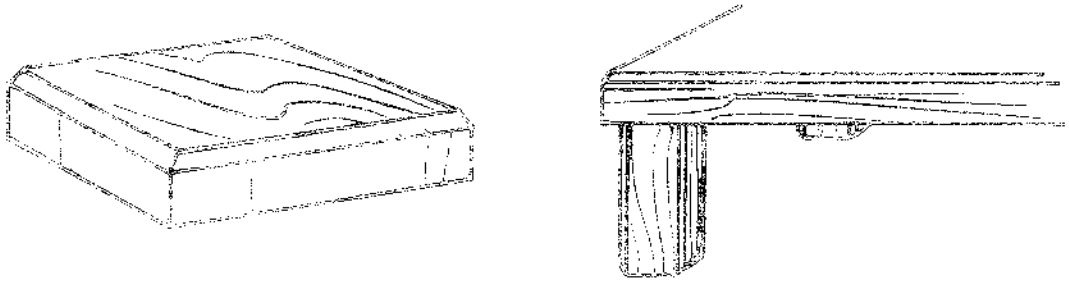
Slight bevel

Pronounced bevel

LESSON 2
ASSIGNMENT 12

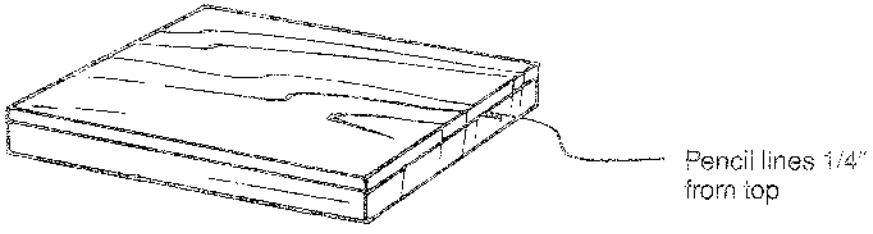
HOW TO CUT CHAMFERS

DESCRIPTION:
Chamfers differ from bevels in that, while bevels cut the entire end or edge at any angle less than 90°, chamfers cut off only the top corners. Most chamfers are at 45°.

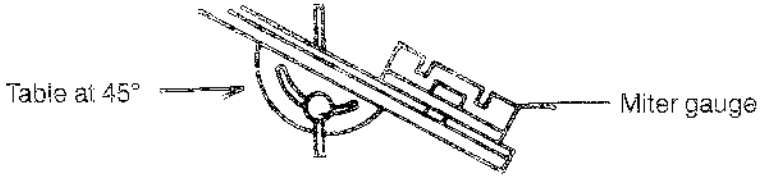


USE:
Chamfers are frequently used in the construction of some types of projects. They are commonly used on table tops, stools, boxes, and cabinets to "ease" the sharp edge or for decoration. They are also used on square legs to give them a more graceful shape.

OPERATIONS:
1. Set saw table at "0". Prepare a board 3/4" × 3" × 8".
2. Lock headstock and carriage at extreme right of tubes. Tilt saw table to 45°, feeding out on [illegible] with a thin [illegible].
3. Mark off on edge of board the desired width of chamfer. In this case let it be 1/4".

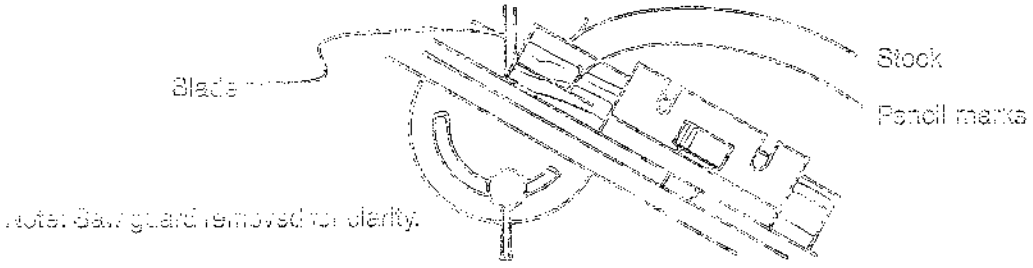


4. Put miter gauge in right table slot.

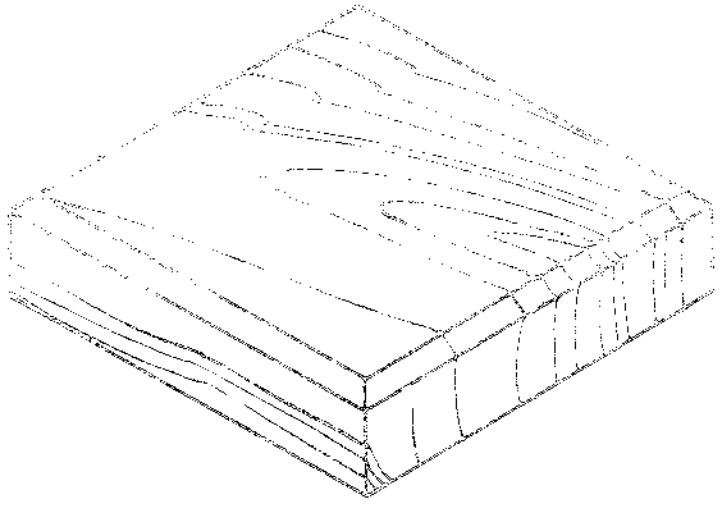


Note: Saw guard removed for clarity.

5. Adjust so that inside saw blade tooth is even with pencil mark on edge of stock, with marked edges of stock down.
6. Make cuts on all four edges.



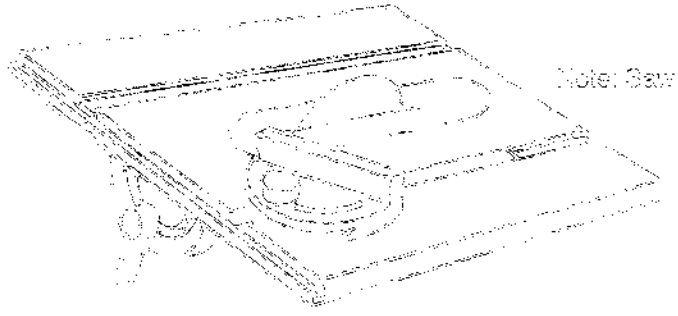
WARNING: Turn off machine and let it come to a complete stop. Do not return stock after each cut but remove from miter gauge and return empty gauge.



LESSON 2
ASSIGNMENT 13

HOW TO MAKE COMPOUND ANGULAR CUTS

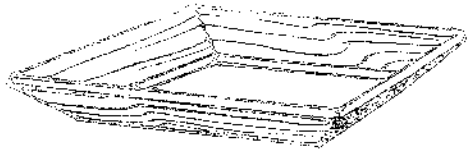
DESCRIPTION:
Compound angular cuts are made by cutting stock with the saw table tilted and an edge of the stock against the miter gauge but not at an angle less than 30°.



Note: Saw guard removed for clarity.

USES:
Compound angular cuts are used in picture frames, shadow boxes, planter boxes, mirror frames, and similar projects requiring mitered joints.

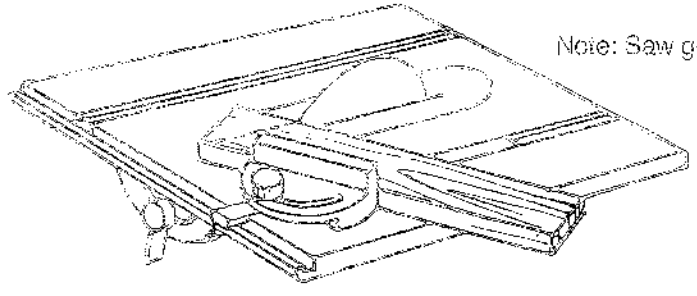
MATERIALS:
Stock as required for project. Typical stock for this exercise is



1. Prepare 4 pieces of stock 3/4" × 1-3/4" × 11".
2. Tilt saw table 30° right with headstock and table at right.
3. Set miter gauge 54-3/4° (left) and place in right table slot.

Note: For work angles other than 45° see pages 68 and 69 of textbook.

4. Place stock with edge against miter gauge.
5. Adjust saw blade height to 1-1/4".
6. Adjust stock so that the cut will start a short distance from end nearest you. A miter gauge safety grip will avoid "creep".



Note: Saw guard removed for clarity.

7. Make cut very carefully and slowly.
8. Repeat on one end of remaining pieces. Turn off saw.
9. Measure 10" from cut off tip on all 4 pieces.

10. Turn stock over and end for end. Place the short side against miter gauge holding stock with safety grip.
11. Adjust stock so that saw will start cutting at pencil mark on edge of stock. See sketch on the next page.

Note: This adjustment must be done very accurately. Check your work carefully before you make cut.

12. Start saw and make cut.
13. Repeat with remaining pieces.

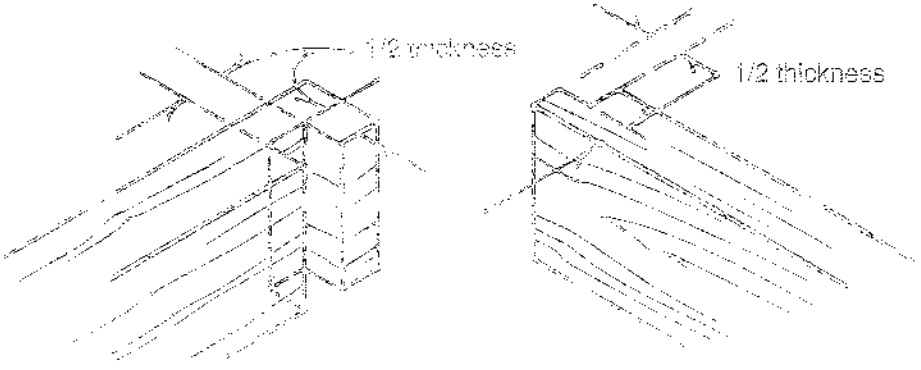
Note: Store the pieces for the next assignment.

LESSON 2
ASSIGNMENT 14

HOW TO MAKE TWO COMMON WOODWORKING JOINTS

I. DADO AND RABBET JOINT

DESCRIPTION:
A dado and rabbet joint is usually made with two pieces of equal thickness and width. A tongue in the end of one piece, formed by a rabbet having depth and width equal to one half stock thickness, exactly fits into a dado cut in the second piece. The outside edge of the dado is one half stock thickness from the end of the stock.



USE:
Dado and rabbet joints are extensively used in cabinetmaking. When cut for a snug fit and accurately glued, the joint is strong. Use for drawer and box corners is common.

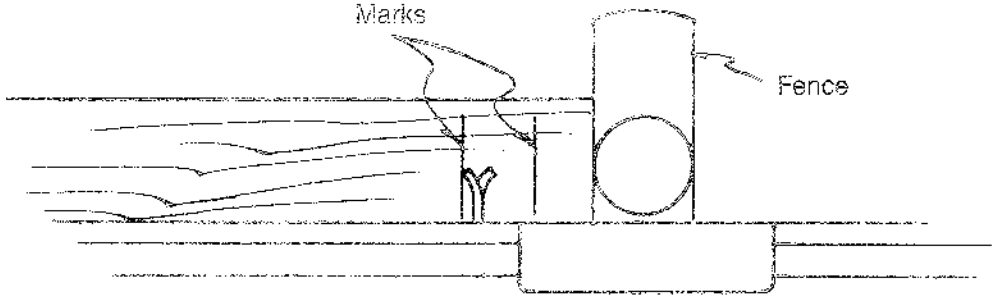
OPERATIONS:

WARNING: When cutting dadoes and rabbets, it is necessary to remove the upper guard. Whenever you remove the upper saw guard, keep the lower guard in place and work with extreme caution.

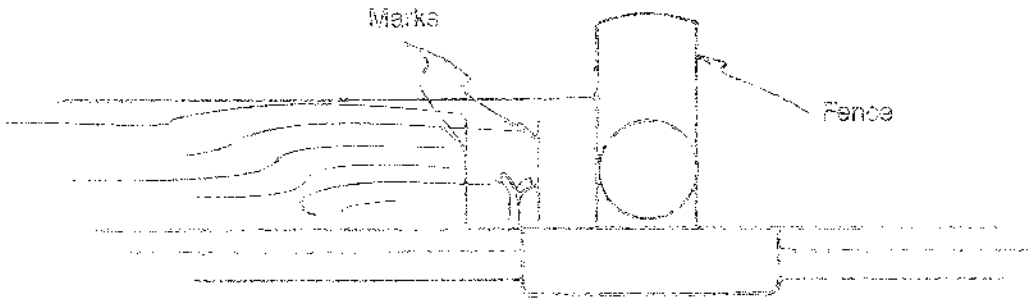
1. Prepare a piece of stock 3/4" × 3" × 10".
2. Crosscut stock into two pieces of equal length.
3. Mark pieces "A" and "B".

Note: Since standard 1" stock does not always measure exactly 3/4", cutting the dado and rabbet to 3/8" measurements will not necessarily be 1/2 the stock thickness. However, it will make a completely satisfactory joint.

4. Butt the end of "B" across end of "A" to form a right angle and square a line on edge of "A" indicating exact width of stock.
5. Mark a second line on edge of "A" exactly 3/8" away.
6. Set saw blade height at 3/8" and lock carriage with blade close to left edge of table slot.
7. Set fence so the outer saw blade tooth is on line farthest from fence.

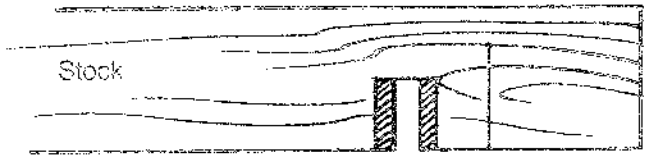


9. Advance quill feed until inner saw blade tooth is exactly on other line. Lock quill.

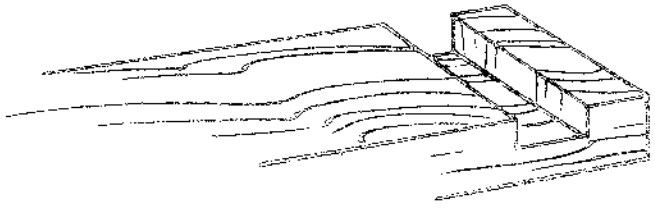


8. Set depth dial at "0" and lock.
10. Release quill lock, retract quill and relock.
11. Set miter gauge in left hand slot, place workpiece "A" against it, butted against fence.

12. Turn on saw and make cut, removing stock at end of cut and returning miter gauge.
13. Advance quill 1/8" and repeat cut, continuing until depth stop is reached.

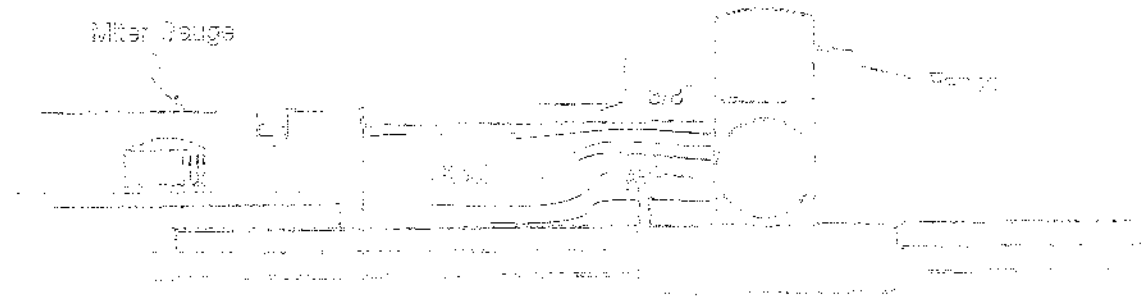


14. You now have a dado 3/8" × 3/8".

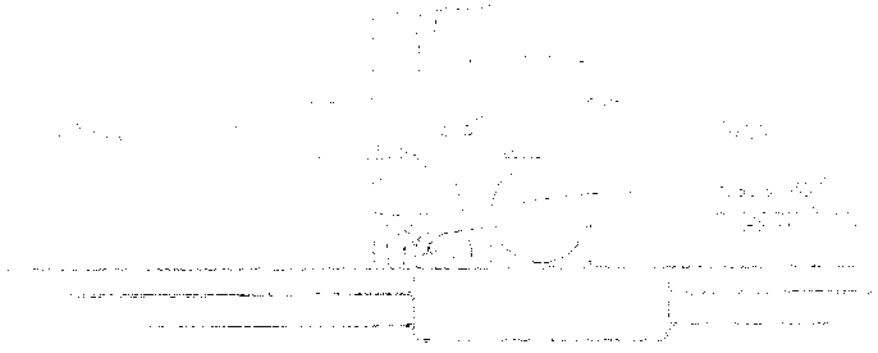


LESSON 3
ASSIGNMENT 14

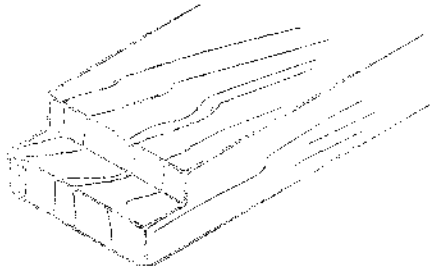
15. Set fence 3/8" from inner saw blade tooth.
16. Advance quill until miter saw blade tooth is 3/8" from fence and lock quill.
17. Place stock "B" against miter gauge with end butted against fence.
18. Turn on saw and make cut.



19. Unplug quill feed and lock.
20. Place stock "C" against fence and miter gauge with end butted against stock "B".

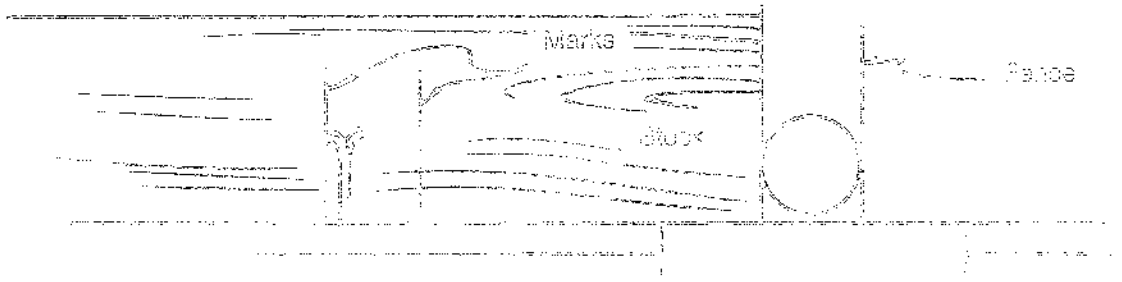


21. Turn on saw and make cut, holding firmly down on table and against fence.

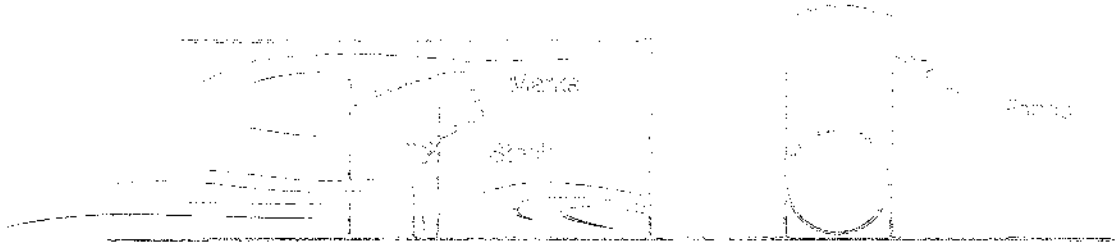


LESSON 2
ASSIGNMENT 14

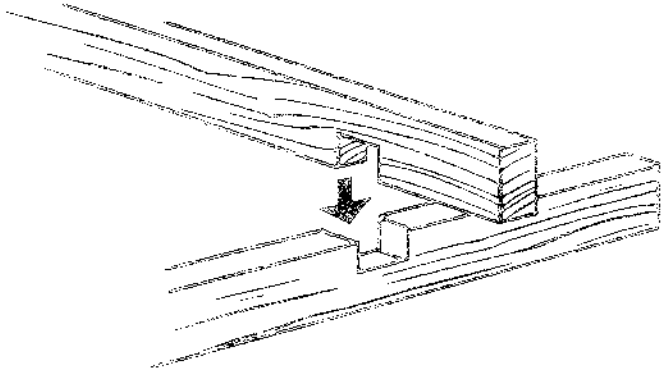
7. Set rip fence so outer tooth of blade is on mark farthest from fence. (The marks made in Step 4.)



8. Place miter gauge in left slot and cut both pieces on edge against it and pulled against fence. Hold marked face of stock toward blade.
9. Hold pieces firmly together against miter gauge and make cut.
10. Still holding both pieces firmly together remove from miter gauge and return gauge.
11. Reposition the two pieces so that the edge of blade toward the fence cuts exactly on the other mark.



12. Hold pieces together, remove from miter gauge and return gauge.
13. Keep repeating cuts, each time sliding both pieces toward fence the width of a saw blade cut, until all waste is removed.
14. You now have two slots or cross dadoes. Assemble the pieces.

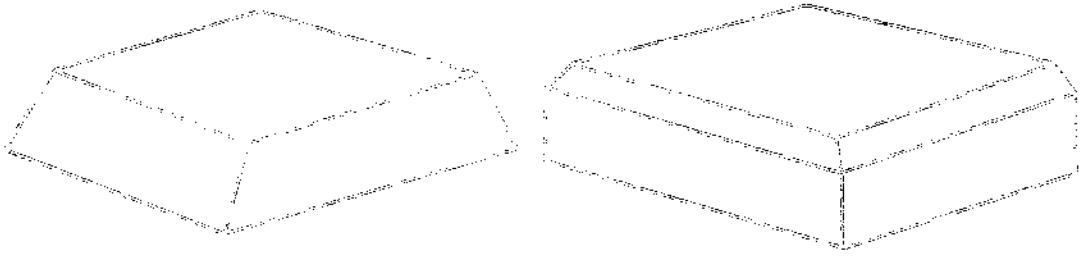


TEST FOR LESSON 2

TRUE OR FALSE: Circle your selection.

T F 1. In cutting tapers on wide stock, the smaller angle is laid off on the miter gauge protractor.
T F 2. In assembling the project in Assignment 9, each side overlaps the front and back.
T F 3. The remaining [illegible]
T F 4. The [illegible]
T F 5. Chamfers are usually [illegible]
T F [illegible]
T F [illegible]
T F [illegible]
T F 8. The stock shown in [illegible]
T F [illegible]
T F [illegible]
T F 10. When cutting a [illegible]
T F [illegible]
T F [illegible]
T F [illegible]
T F [illegible]
T F 15. In cutting long [illegible]
T F 21. Standard [illegible]

MULTIPLE CHOICE: Underscore your choice.
22. In cutting tapers on wide stock and angle on the miter gauge produces the smallest taper (TRUE) (BOTH) (BOTH).
23. In cutting tapers with a tapering jig the [illegible]
24. The angle in the tapering jig remains (the same) (is increased) (is decreased) in making the second cut.
25. Underscore the sketch of a bevel.



26. The angular cut on the edge of a board to enhance its appearance is the (bevel) (chamfer).
27. In cutting compound angles the table angle is (less) (greater) than the miter gauge setting.
28. In cutting compound angles on a four sided figure, the work angle in Assignment 19 is (60°) (45°) (90°).
29. In making the second cut in sawing tapers on wide boards the stock is (turned end for end) (turned over) (kept in same position).

LESSON 3
INTRODUCTION

[illegible] BUILDING

You have now progressed through two lessons and fourteen work assignments, and you are to be congratulated on your progress. Lesson 3, while it still gives full step-by-step instructions, has assignments that require more careful settings and more precise workmanship.

Always remember that your finished project will be exactly as accurate as the settings you make. A few minutes extra time spent in checking your settings will save much wasted time and material. Whenever you are in doubt, make a test cut on scrap the same size as your workpiece and check your dimensions.

[illegible] easier and more [illegible] you [illegible] built and stored your [illegible] An auxiliary fence (page [illegible] of [illegible] book) about 8" high is helpful whenever sawing [illegible] Retractable casters give your Mark V [illegible] extension [illegible] the capacity.

[illegible] and make you a better craftsman.

ASSIGNMENT 15

HOW TO MAKE a SPLINE JOINT in THAT!

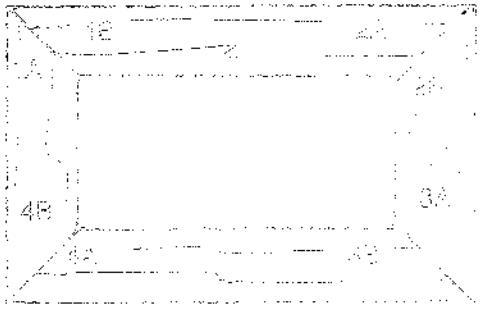
DESCRIPTION:
Two matching surfaces held together by a spline form a spline joint. The spline, usually a strip of hardwood, fits snugly into a slot which is formed by grooves or channels cut in the meshing surfaces. Spline joints are named in accordance with pattern, "blind" or "open" and "through" or "stop".

[illegible]

[illegible]

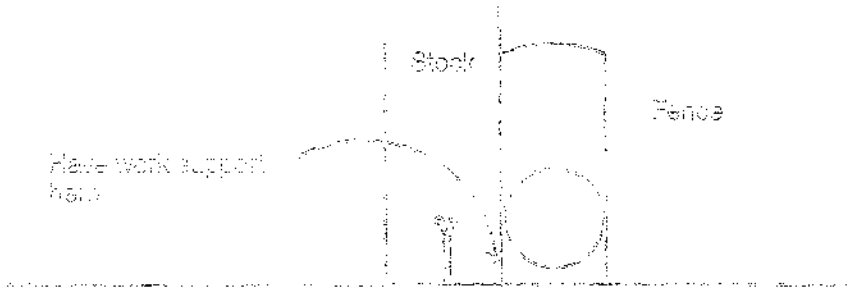
REMEMBER: When cutting splines, the [illegible] guard is removed, keep the [illegible]

Let us fasten together the frame made in Assignment 14. Assemble it, and when dry [illegible] with the best side up. Now mark the corners with a pencil as shown below.

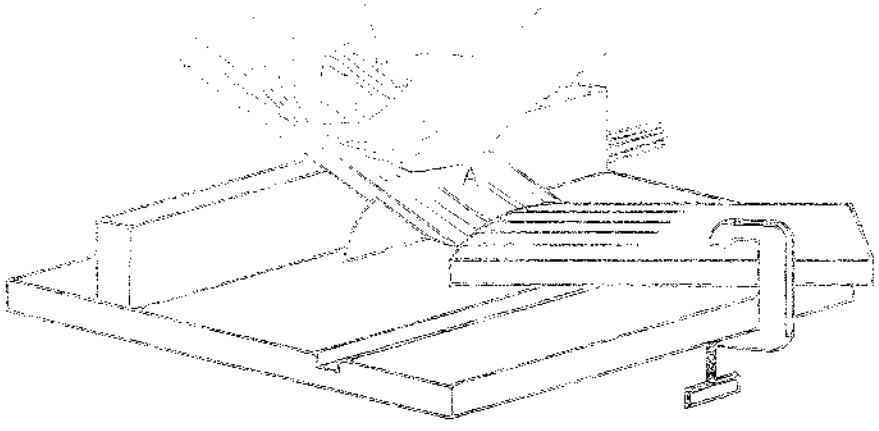


LESSON 3
ASSIGNMENT 15

1. Adjust saw blade for 3/8" depth of cut
2. Set rip fence so cut will be approximately in the center of 3/4" stock. (3/8" to center of blade.)
3. Be sure there is at least 1/8" of table insert between blade and fence for work support. Use quilt feet if necessary.



4. Clamp feather board about 90° to left side of saw table and adjust until center of curved end is about 1/4" from blade on the center of blade. (See directions for making the feather board supplied in your safety kit. (See page 74 of textbook.)
5. Hold mitered end of stock marked "B" on table with pointed corner toward you.
6. Please stand to one side. Push stock against fence with left hand. Use push stick.



7. Make cut slowly.
8. Repeat on the other three ends marked "A".
9. Place mitered end of stock marked "18" on table with pointed end away from you.

Note: This assures the back side of all pieces will be against fence and spline grooves will therefore line up properly.

10. Hold as on previous cuts and feed slowly.
11. Repeat on other three ends marked "B".

LESSON 3
ASSIGNMENT 16

HOW TO MAKE END LAP JOINTS

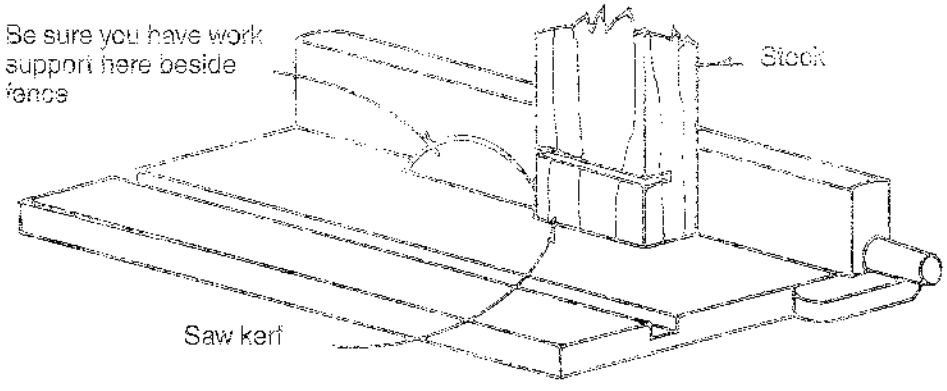
DESCRIPTION:
Two pieces of stock of equal thickness can be joined in an end lap after removing half the thickness at one end of each from an area equal to the width of the mating piece. This is really nothing but two fitted end rabbets.

USE:
End lap joints are not flush surfaces with minimum effort and expense. They are used in joining sash at mullions, bleachers, planters and trellises, and simple furniture.

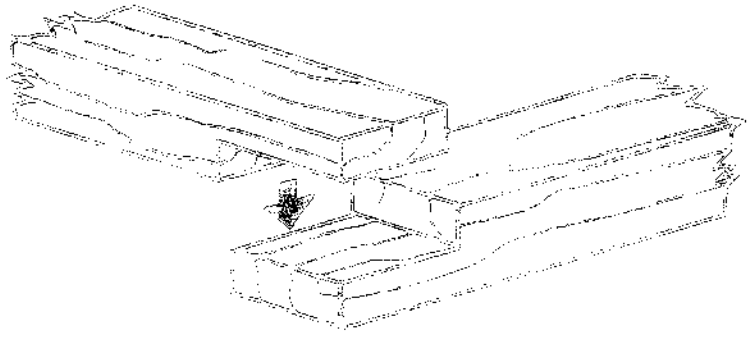
OPERATION:

WARNING: When setting the rip fence, be sure the stock will not bind between the fence and the saw blade. Otherwise, this could cause the stock to kick back violently, possibly causing serious injury.

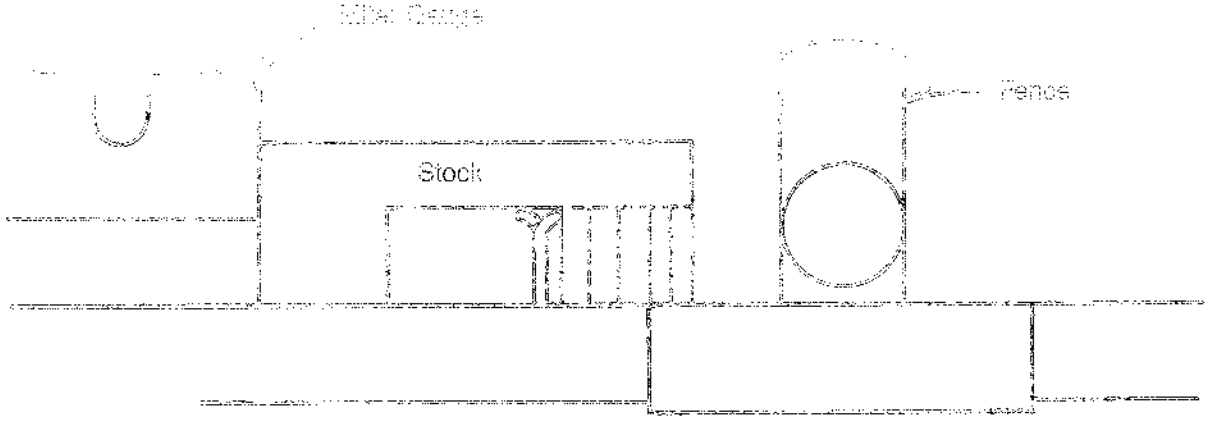
1. Prepare (2) pieces of stock 3/4" × 1-3/4" × 16".
2. Set the saw blade height to 3/8" (1/2 stock thickness).
3. Place miter gauge in left table slot.
4. Place rip fence 1-3/4" to right of outside saw blade tooth.
5. Place edge of stock against face of miter gauge and end against rip fence.
6. Make crosscut on both pieces.
7. Adjust saw blade height to 1-3/4".
8. Set rip fence 3/8" to right of **inside** tooth.
9. Remove miter gauge.
10. Grasp the top of the stock with the right hand, crosscut surface toward saw blade, and press end flush on saw table.
11. Grasp the stock with the left hand just above the rip fence and press firmly against the fence.
12. Stand to left of line of saw blade.
13. Push stock slowly with both hands, while maintaining stock perpendicular.



14. After the cut is made, raise the stock up from table.
15. Repeat the cut on the other piece of stock.
16. Fit the two members together as shown on sketch on next page.



[illegible]

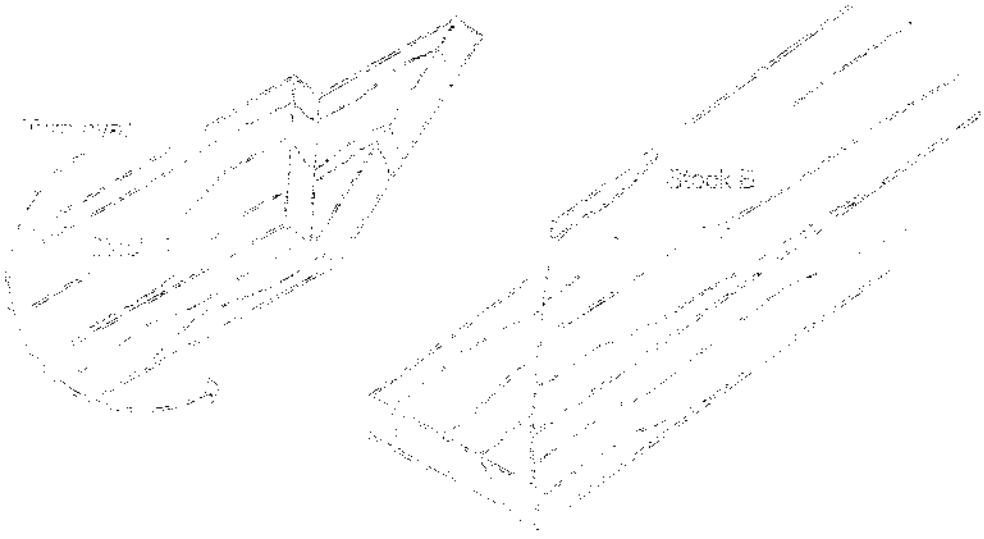


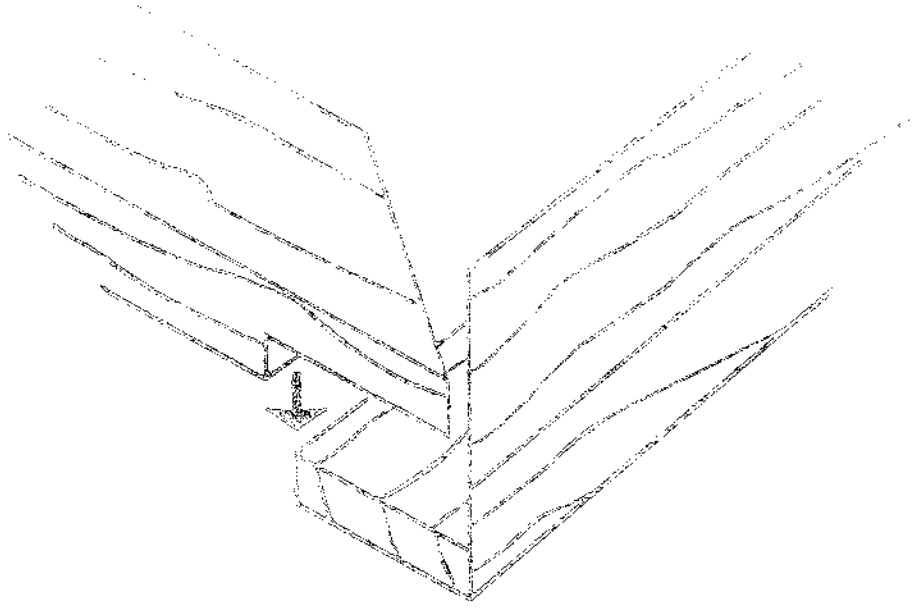
19. Lift up when cut is complete.

Note. Again, as in making the half lap joint, on stock too wide for the height of the saw blade, the surplus stock will have to be removed on stock "A" by making successive saw kerfs as was done on "B".

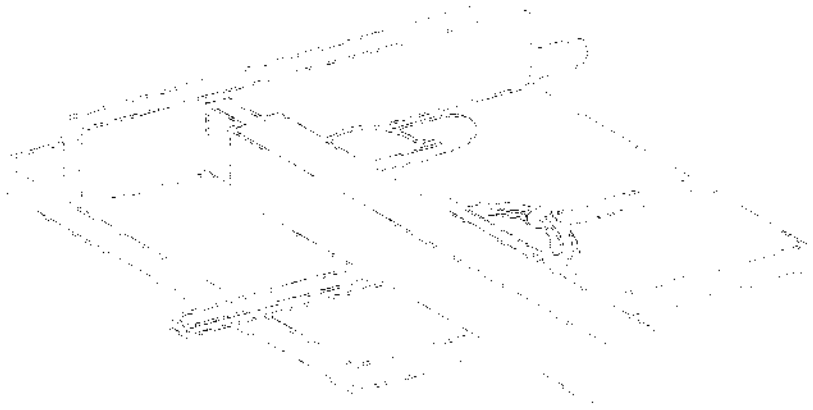
20. Remove fence.
21. Adjust saw blade to 1" height.
22. Set miter gauge 45° left and place in left table slot.
23. Place stock "A" with uncut surface on table and make 45° cut through lower corner of joint and shelling with inside saw blade to fit even with right lower corner of stock.

24. Fit "A" and "B" together as shown in sketch below.

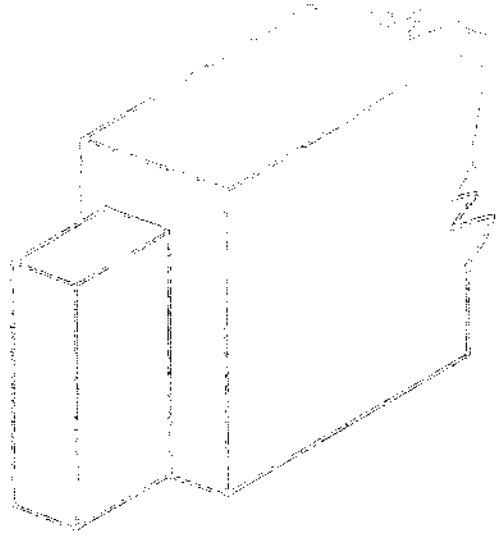




12. Adjust saw blade to 1½" height.
13. Make cut across end using clearance block.
14. Move stock one kerf width to left and repeat cut.

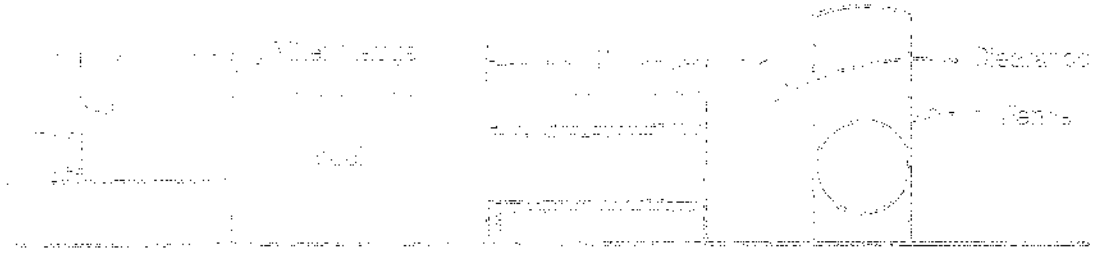


15. Continue until entire waste area is removed.
16. The tenon should look like the illustration below.

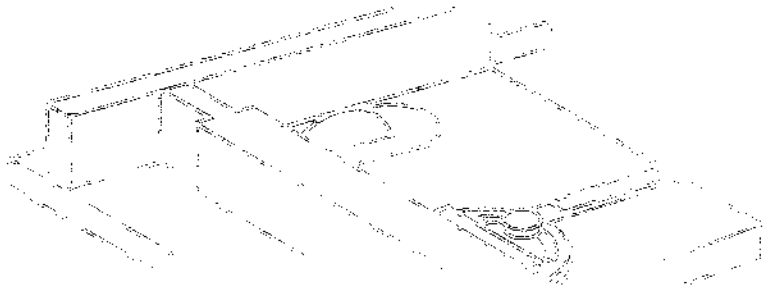


Note: Save this tenon as in future lessons we will make a mortise to fit it.

ASSIGNMENT 10

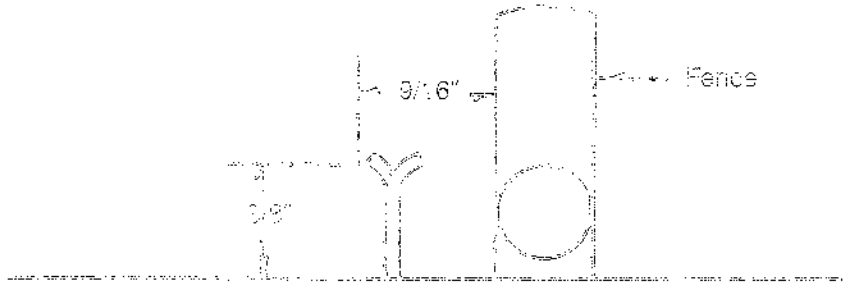


9. Make shoulder cuts on both sides of stock "A".
10. Remove block. Place rip fence 5/8" from outside saw blade tooth.
11. Adjust saw blade height to 3/4".
12. Make shoulder cut on one edge of stock.



13. [illegible]

14. This will leave a haunch 3/8" long and 3/4" thick to fit the end of the groove we will now cut.



15. Make the setup above for grooving. (See Steps 11 through 14 of Lesson 1, Assignment 6).

[illegible] 13

TEST

[illegible]

TRUE OR FALSE: Circle your selection.

T F 1. Feather boards are used for the sole purpose of holding [illegible]
T F 2. The grain of a spline runs in opposite direction to the grooves.
T F 3. Both members of a half lap joint must be the same width.
T F 4. When removing the surplus material in a half lap miter joint, [illegible] members.
T F 5. In making the half lap miter joint, the side [illegible]
T F 6. The saw blade height [illegible] the same [illegible]
T F 7. The haunch on a haunched mortise and [illegible]
T F 8. The groove in a [illegible]
T F 9. Part of the tenon is removed in cutting the groove on [illegible]
T F 10. There is a [illegible]
T F 11. The sawing action [illegible]
T F 12. The [illegible]
T F 13. [illegible]
T F 14. When the stock to be joined is [illegible]
T F 15. [illegible]
T F 16. [illegible]
T F 17. [illegible]
T F 18. [illegible]
T F 19. [illegible]
T F 20. [illegible]

MULTIPLE CHOICE: Underscore your answer.

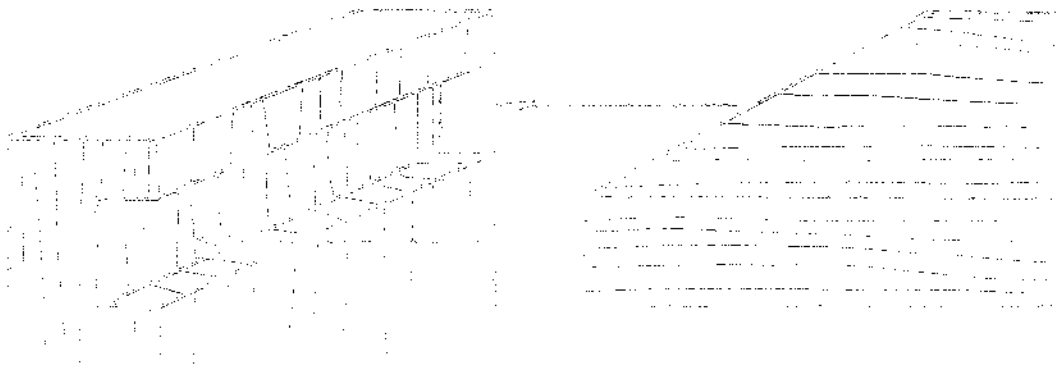
1. Splines should fit in the grooves (fairly loose) (very tight) (just right).
2. Half lap miter joints are used because (they are [illegible])
3. In making the spline joint in Assignment 17 [illegible]
4. There (is only one) (are two) ways of sawing off the [illegible]
5. The thickness of a tenon is determined on the (width of the rail) [illegible]
6. In cutting the shoulders on a tenon the waste stock is between the [illegible] (on table to left of saw).
7. In making the vertical cuts on a tenon, [illegible] saw out.
8. In cutting the cheek cut on the haunched mortise and tenon joint, the [illegible] from the ripping fence.
9. Mortise and tenon joints are used most in (furniture) (structural framing).
10. The tenon made in Assignment 16 is for a (blind) (through) [illegible]

LESSON 4
ASSIGNMENT 20

HOW TO CUT DADOES

WARNING: When cutting dadoes, it is necessary to remove the upper saw guard. Whenever you remove the upper saw guard, keep the lower guard in place and work with extreme caution.

DESCRIPTION:
A dado is a rectangular groove cut across the grain of stock into which the edge or end of other stock fits. Common types named in accordance with design are "plain", dovetail", "blind" and "corner".

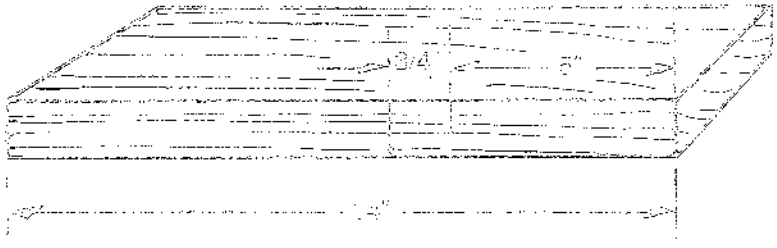


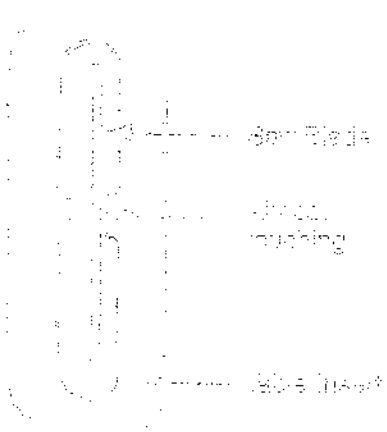
[illegible]

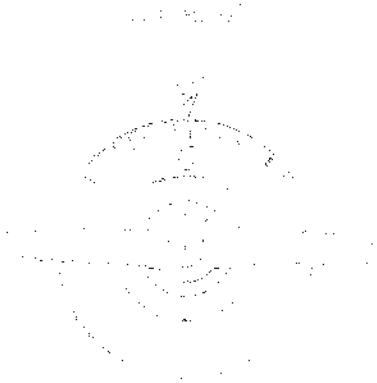
OPERATIONS:

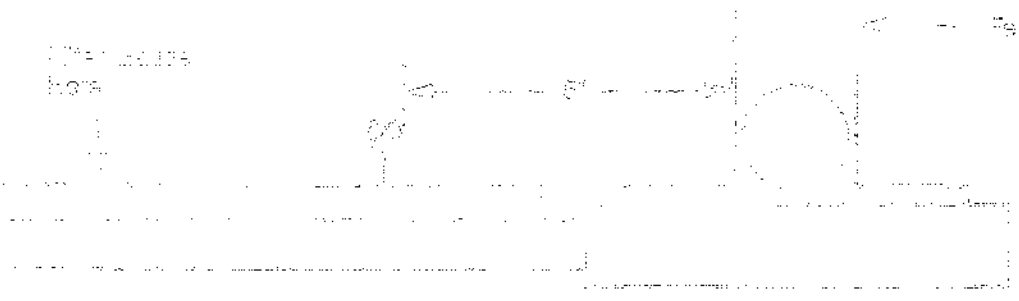
WARNING: When cutting dadoes, it is necessary to remove the upper saw guard. Whenever the upper guard is removed, keep the lower guard in place and work with extreme caution.

1. Prepare a piece of stock 3/4" × 6" × 14".
2. Square a line across one edge 5" from one end.
3. Square another line 3/4" away.

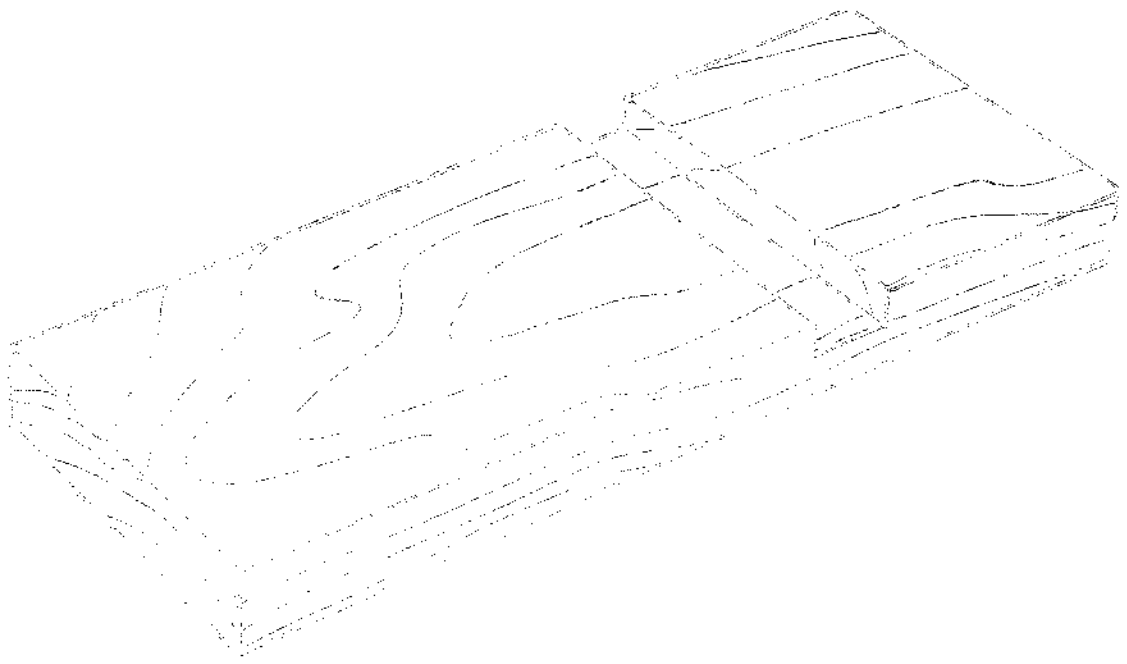




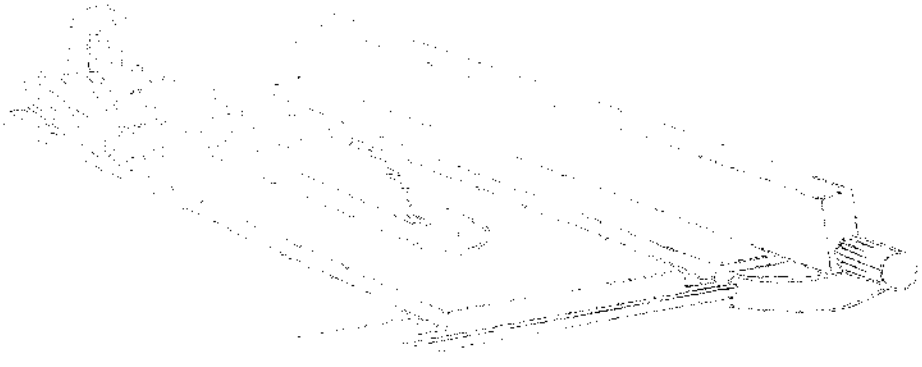




15. Repeat Steps 10, 11, and 12. The stock should now appear as follows:

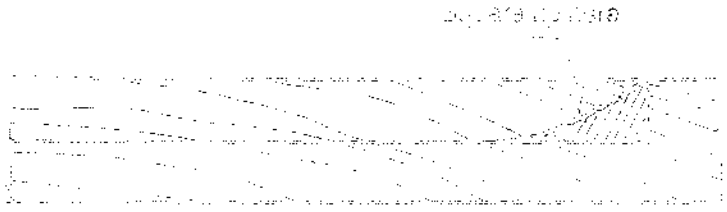


ASSIGNMENT 21

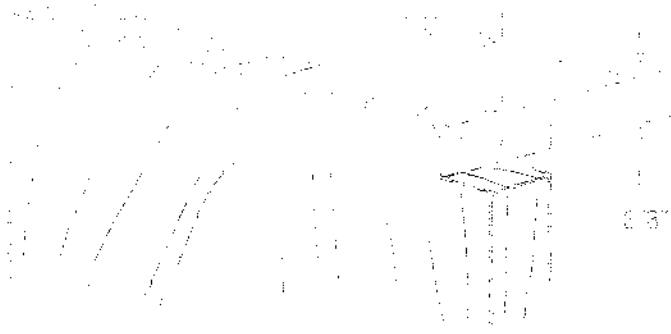


ASSIGNMENT 21

3. Cut a stop dado in the exact center of your wood block, using exactly the same procedure as in Assignment 20.
4. Square up the end of the dado with a sharp chisel.



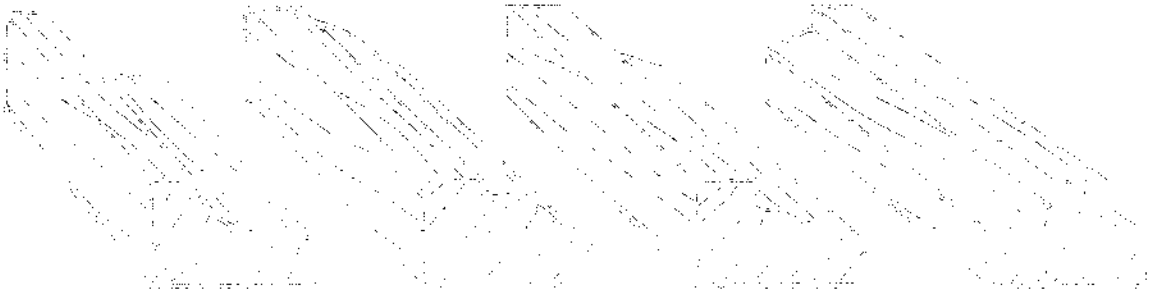
5. Cut a rabbet on the edge of a small piece of stock to form the same T-shape as in Assignment 20.

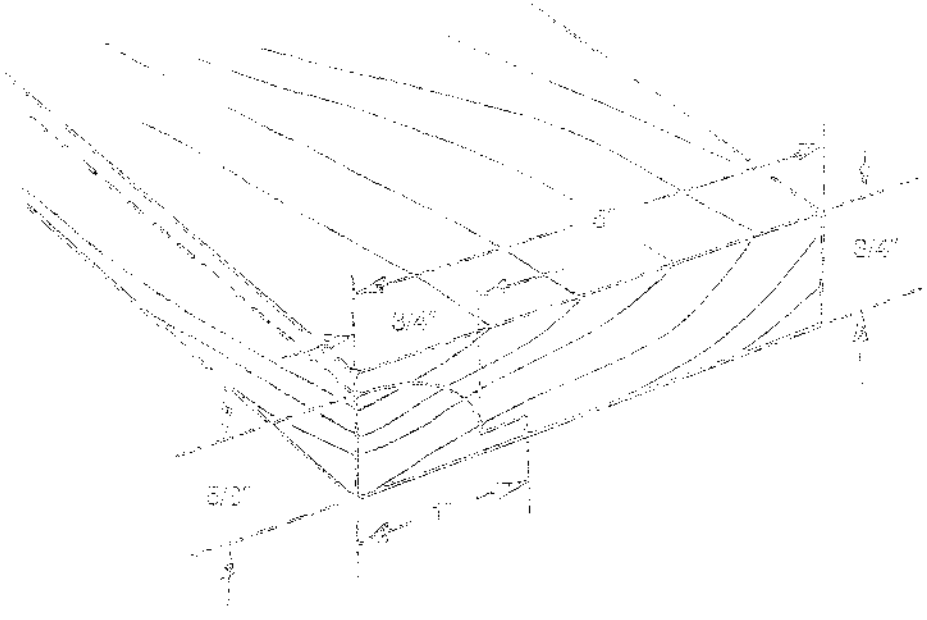


6. The two pieces should fit together snugly.

HOW TO CUT A COVE MOLDING

DESCRIPTION:
Moldings are pieces of stock which have been shaped by cutting in cross section, are straight, concave, convex, angular or irregular. Such shapes may be used for decorative purposes. The ends may be mitered, butt, shoulder set, the joints molding cutters, or a combination of these by these tools.

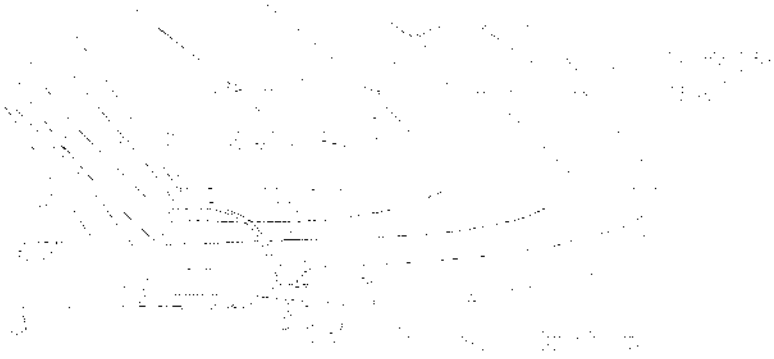




LESSON 4

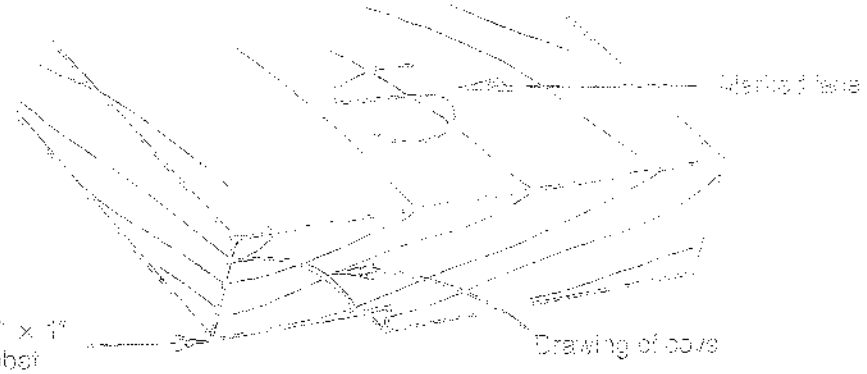
ASSIGNMENT #2

1. Prepare one piece of stock [illegible] and another [illegible]
2. Outline the cross section [illegible] as indicated in sketch.



3. [illegible]
4. [illegible]
5. [illegible]

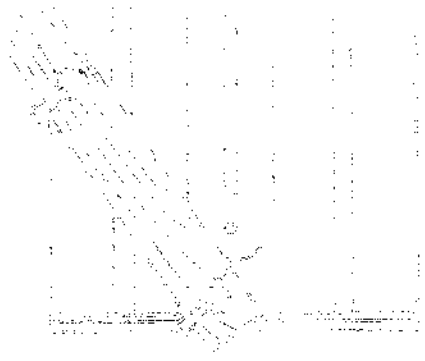
6. Set saw blade to 1" height.
7. Lock rip fence 5.8" from inside tooth of saw blade.
8. Place edge of stock to be molded on table, [illegible] and [illegible]
9. The stock is now cut by rabbet 1.8" × 1".



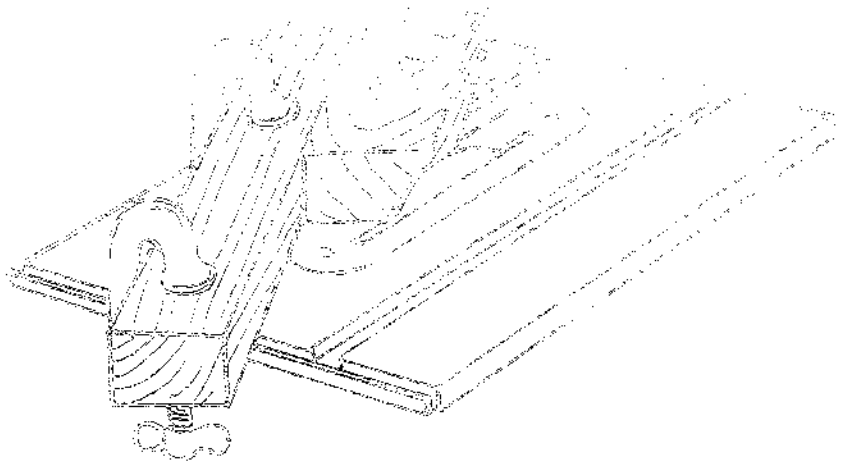
[illegible]

[illegible] Set saw blade to 5/8" height.
[illegible] Clamp guide strip (stock) [illegible] to 6" of saw blade angled from the front center toward back left corner.

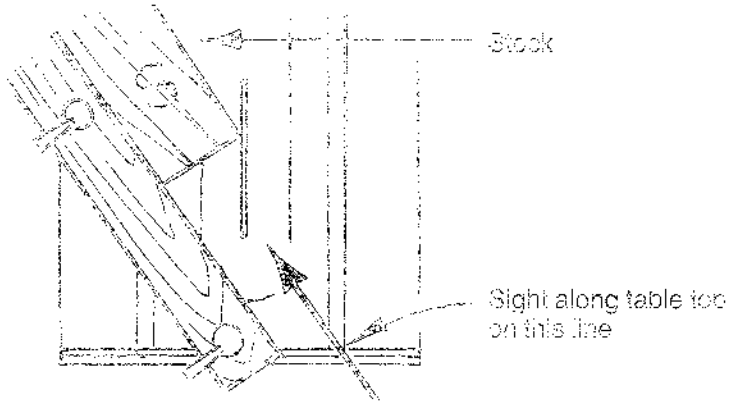
[illegible] See illustration on page [illegible] of textbook.



[illegible] Set the stock against the guide strip and move both to the right until the edge of the stock lines up with the mark on the end of the [illegible] Clamp the guide strip to the table top. Check the setup by moving the stock back and forth. The edge of the stock should line up with the mark on the end of the table top. Check the distance between the blade and the guide strip. It should be [illegible] inches wide.



Note: The correct positioning of stock and guide strip will require considerable trial and error. It is easiest to do by sighting flat across table top in line with the out edge of the stock. You can then line up the outside of the blade with the mark on the end of the stock.



ASSIGNMENT

13. Clamp feather board to table to hold work against fence. Set blade height.
14. Make cut holding stock against guide and feather board.

WARNING: Stand to left of blade. Never reach behind blade with your right hand.

15. Lift stock over blade using push stick. Place stock against fence and feather board. Push stock past blade with push stick.

ASSIGNMENT

ASSIGNMENT 32

HOW TO MAKE A DOWEL JOINT

DESCRIPTION:

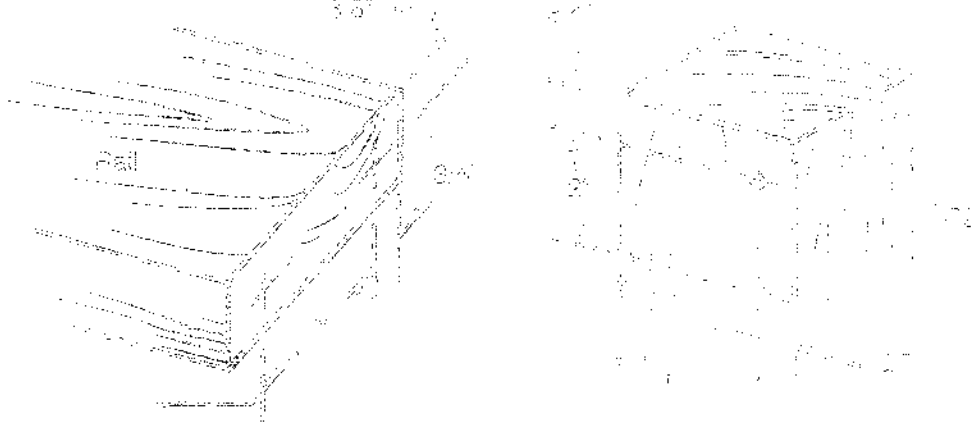
A dowel joint is made by drilling matched holes [illegible] and inserting a dowel pin [illegible] to hold the pieces together. [illegible] dowel pin [illegible] diameter equal to one half the thickness of the [illegible]. The length of the dowel pin [illegible] of the thickness of the [illegible].

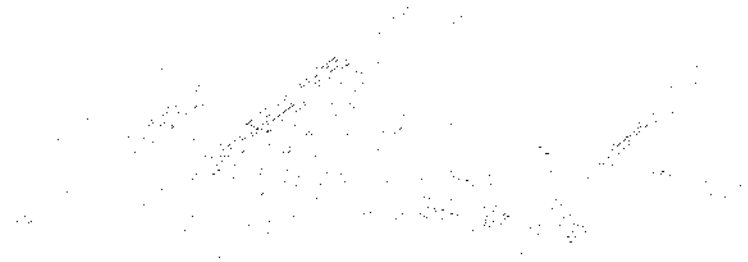
NOTE:

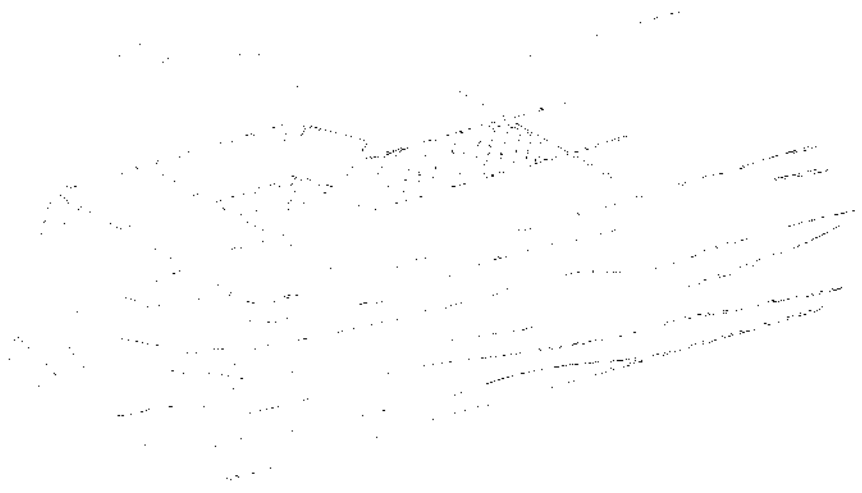
[illegible] dowel joint [illegible] by using a dowel jig. [illegible] jig [illegible] holes [illegible] dowel pin [illegible] jig [illegible] the [illegible] of the [illegible] jig [illegible] the [illegible] of the [illegible].

OPERATIONS:

1. Prepare two pieces of stock 3/4" x 3-1/2" x 12" [illegible] 4" [illegible].
2. On one end of 3-1/2" wide stock, scribe a [illegible] line [illegible] ends of hunter line. Punch mark the two intersections.
3. Mark one end of 1-3/4" stock. On one side, scribe a [illegible] line [illegible] spaced lines 3/4" and 2-3/4" from marked end. Punch mark [illegible] lines.







LESSON 6
ASSIGNMENT 36

[illegible]

3. Start motor and set speed dial at "5".
4. Feed drill bit slowly while holding stock firmly against fence or miter gauge and table. (Work must be further secured by clamping stock to miter gauge or table.)

NOTE: Raising the drill bit will cause the point to follow the grain of the wood and creep from the centerline. Brad point drill bits are less likely to follow the grain. Retract the drill bit occasionally to clear chips from the hole.

10. When maximum quill extension is reached, retract quill and lock in place.
11. Unlock carriage. Position quill (drill point in bottom of hole by one of the above procedures) over workpiece. Lock carriage.
12. Repeat Operation 9 until full depth of the drill bit has been used.

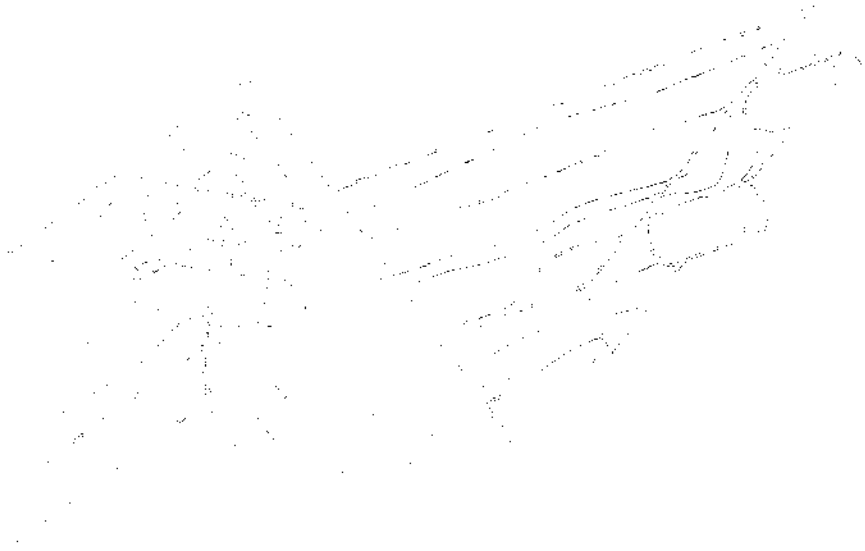
[illegible]

[illegible]

ASSIGNMENT 37

[illegible] MULTIPLE-PIECE MITERED CORNERS

[illegible]



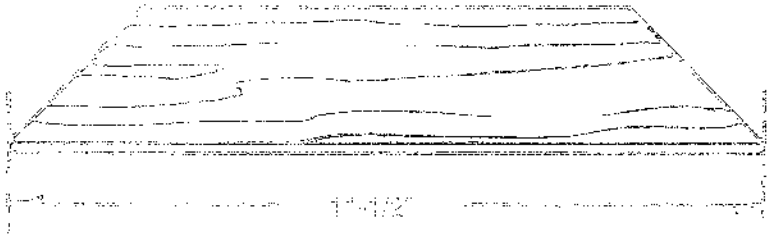
[illegible]

Doweled miter joints are used in [illegible] built-up panels, frames having simple mitered corners, and in furniture. It is a joint that provides additional gluing surface and increased resistance to bending and breaking stresses.

[illegible]

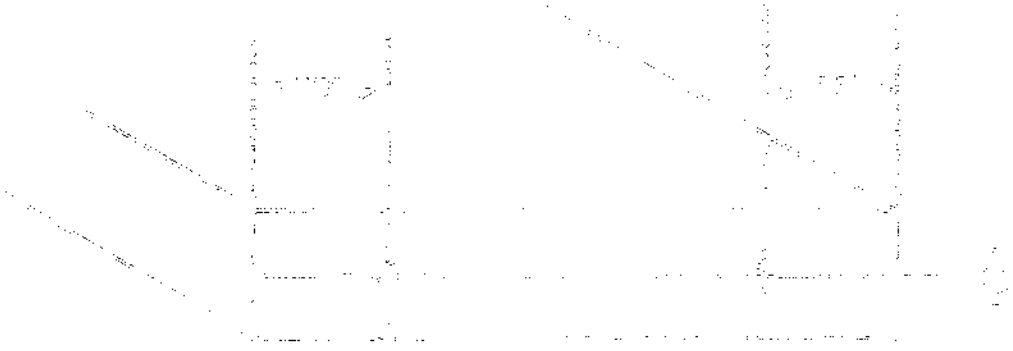
Let us make a four-sided frame having dowered, simple mitered corners.

1. Prepare four pieces of stock 3/4" × 2-1/2" × 12".
2. Make 45° miter cuts at both ends of each piece leaving outside edges 11-1/2".

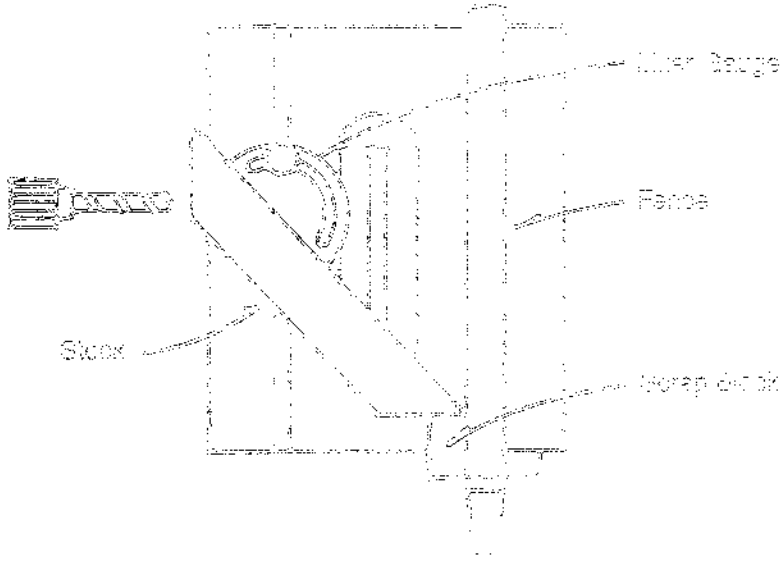


ASSIGNMENT 37

3. Scribe longitudinal center lines on each lateral cut. Space lines 7/8" from both sides of the center line and punch mark the intersections.



4. Set Mark II to machine boring position.
5. Secure 3/8" mill bit in chuck.
6. Set miter gauge at 45° to the right and [illegible] the fence parallel to the miter gauge slot.
7. Place one jaw of a pair of [illegible] against the fence and the other jaw against the miter gauge. Tighten the [illegible] and carefully [illegible] the miter gauge to the fence.
8. Position the [illegible] so that the bit will bore through the [illegible] at the intersection of the center lines.
9. Install [illegible] and [illegible] the [illegible].
10. Clamp a stock block under the [illegible] to prevent splintering.



[illegible] stock firmly against [illegible] the holes in each of all four pieces to a depth of 1-1/16".

[illegible] of drill guide [illegible] drill [illegible] the [illegible] drill point. Drill remaining 3 holes to [illegible] depth.

10. Prepare eight 5/8" diameter [illegible].

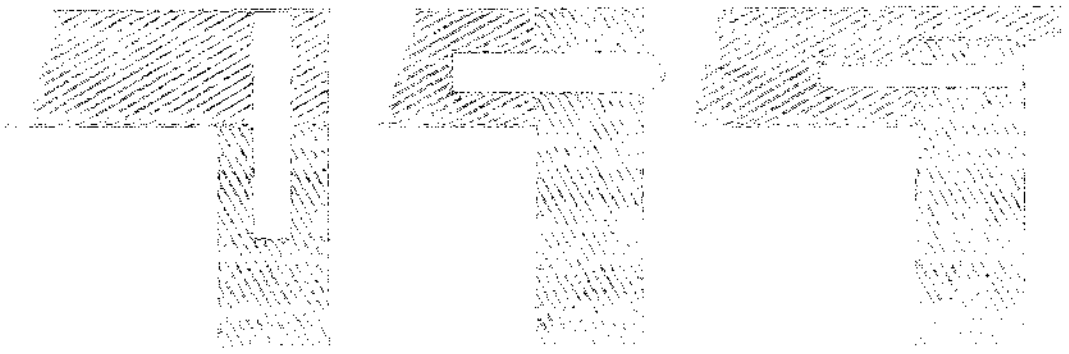
[illegible] frame as in [illegible].

[illegible]

LESSON 6
ASSIGNMENT 38

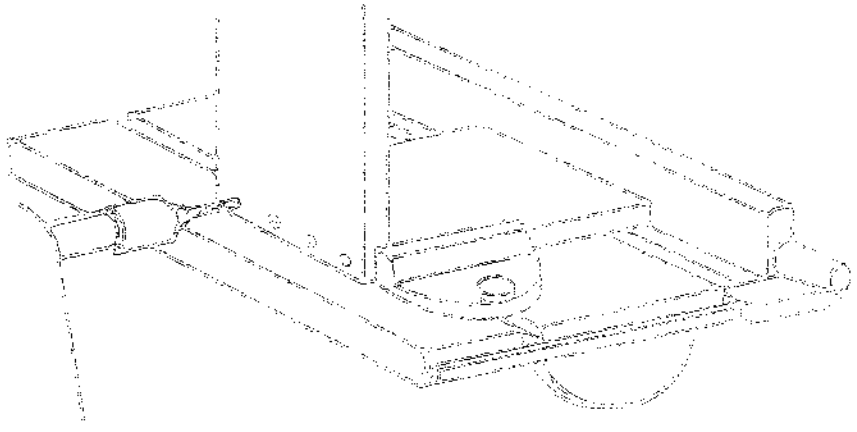
HOW TO DRILL HOLES FOR A PEGGED JOINT

DESCRIPTION:
Two pieces of stock, butted, and held together by a dowel form a pegged joint.



USE:
[illegible] provide strength in [illegible] joints, in which [illegible] is [illegible] used in [illegible] furniture.

PROCEDURE:
1. [illegible]
2. [illegible] this line.
3. Set Mark V in Horizontal Boring position.
4. Secure 3/8" drill bit in chuck.
5. Set miter gauge in left slot and fence on right side of table.
6. Place edge of unmarked stock against miter gauge, left end one inch inside left edge of table, and right end butted against fence.
7. Hold marked stock perpendicular to table, punch marks opposite drill bit and backed against end of stock on the table. Match edges of stock.

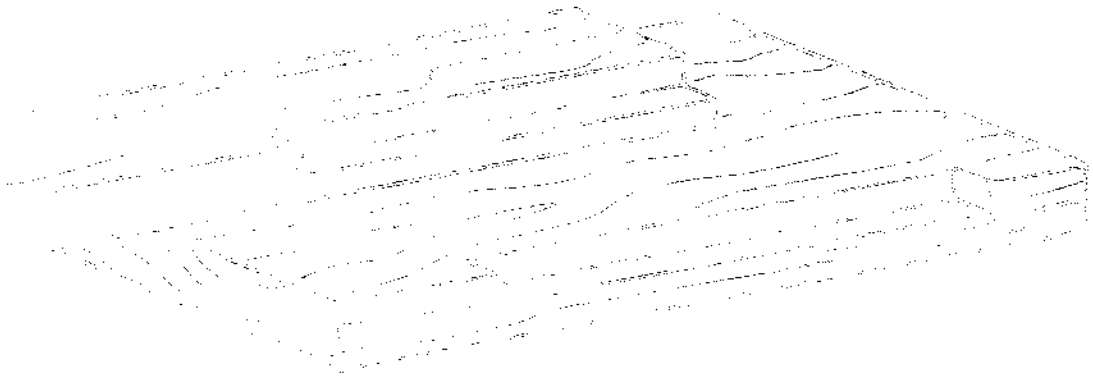


8. While keeping edges of stock matched, position back punch mark in line with drill point by adjusting table height and miter gauge.
9. Remove stock and lock miter gauge to table. Replace stock.
10. Hold stock firmly in position and drill back hole 1-3/4" deep. (Turn around piece). Place dowel in hole.
11. Drill similar holes centered on remaining punch marks, positioning stock by moving miter gauge.

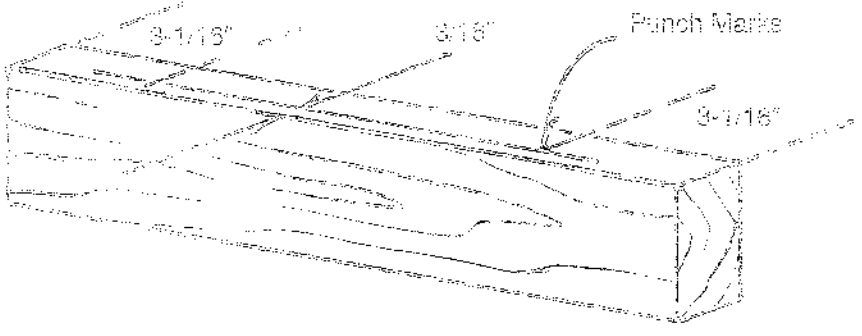
LESSON 6
ASSIGNMENT 39

HOW TO USE ROUTER WHEN CUTTING A STOP RABBET

DESCRIPTION:
A stop rabbet is a rabbet which does not extend to both ends of the edge in which it is cut.

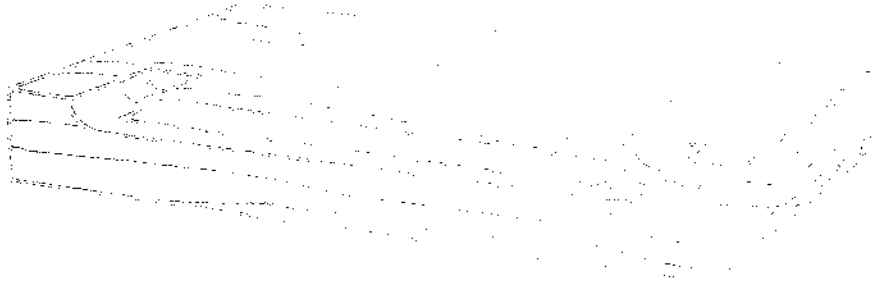


1. Prepare 4 pieces of stock (3/4" x 3" x 12")
2. Set Mark V in Horizontal Boring position.
3. Mount router chuck with 3/8" router bit secured in place.
4. Mark one side of stock. Scribe a longitudinal on one edge, 3/16" from the marked side. Square two lines across the longitudinal, 3-1/16" from each end. Make punch marks at the two intersections.

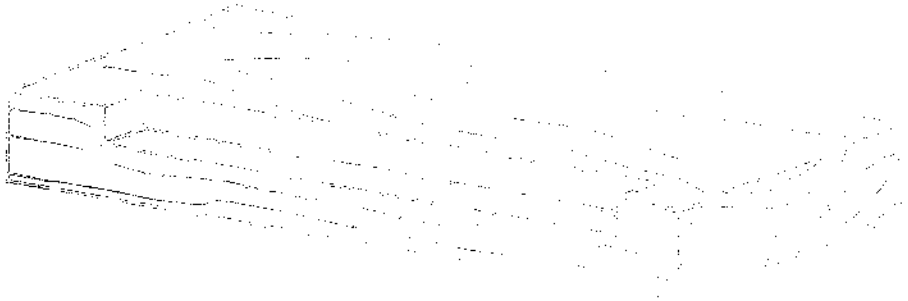


5. Remove miter gauge.
6. Place stock on table.
7. Position left edge
8. Position bar
   rod surface.

11.
12. Hold stock firmly
13. Slide stock toward



14. Position bit 1/4" deep in front
15. Make a third pass, completing the groove.
16. Square ends of rabbet



ASSIGNMENT 40

[illegible]

[illegible] copper, brass and other non-ferrous metals using any bits, other than auger [illegible] quill fed slowly. [illegible] steel and other ferrous metals requires use of "high speed" drill [illegible]

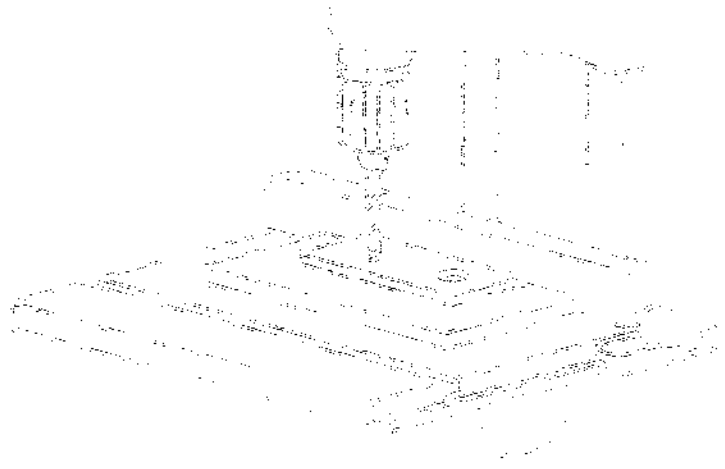
[illegible] altering or adding [illegible] drilling power tools.

[illegible] Square lines [illegible] illustration on page [illegible]

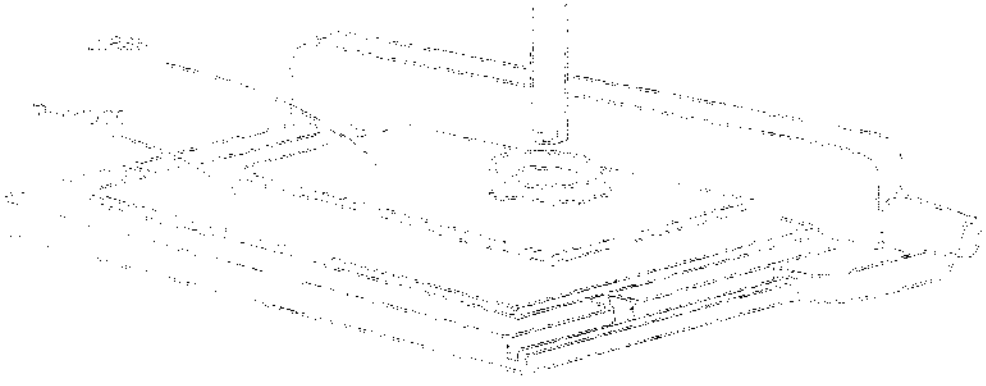
1. Set Mark-o-bit for desired drill [illegible] position.
4. Secure 1/4" high speed drill bit in chuck.
5. Remove miter gauge. Butt the edge of a piece of scrap stock (size not less than iron stock) against fence.
6. Press strap iron punch marks up on scrap and butt against fence.
7. Position right punch mark in line with, and close to, point of drill bit by adjusting carriage, fence, and stock.
8. Set depth dial to stop quill feed before bit reaches table. Start motor and set speed dial to "K".
9. Feed drill bit slowly, using constant pressure on quill feed handle, until drill bit enters scrap stock.
10. Reposition stock and drill through hole centered in left punch mark.

LESSON 6

ASSIGNMENT 40



ASSIGNMENT 4:



1. Select a piece of glass having a total 10 sq. in. area and at least one straight edge 4" or 5" long.
2. Mark out the location of drill. If you wish to make a mistake, use soft white wash pencil or thin paint.
3. Set Mark V in vertical Drill Press position.
4. Place glass in center of table, painted side up and edge butted against fence. Be certain glass have no projections which would prevent smooth
5. Drill a ring of holes in the glass around the outside with a circle the inside diameter of the ring about 3/8".

LESSON 6

ASSIGNMENT 41

7. Secure tube in chuck. Position portion marked on glass under axis of tube by adjusting tool, glass, and table. Use masking or electrical tape to mark glass.
8. Cover exposed surface inside ring with mixture of oil and emery powder.
9. Start motor and set speed dial at "A".
10. Feed drill bit with light pressure. Retract tube frequently to allow mixture to flow and cool.

Note: When drilling glass of irregular shape, such as tubing, it is necessary to use a needle that will hold work in a fixed position until hole is completed.

[illegible]
TEST

TRUE OR FALSE QUESTIONS

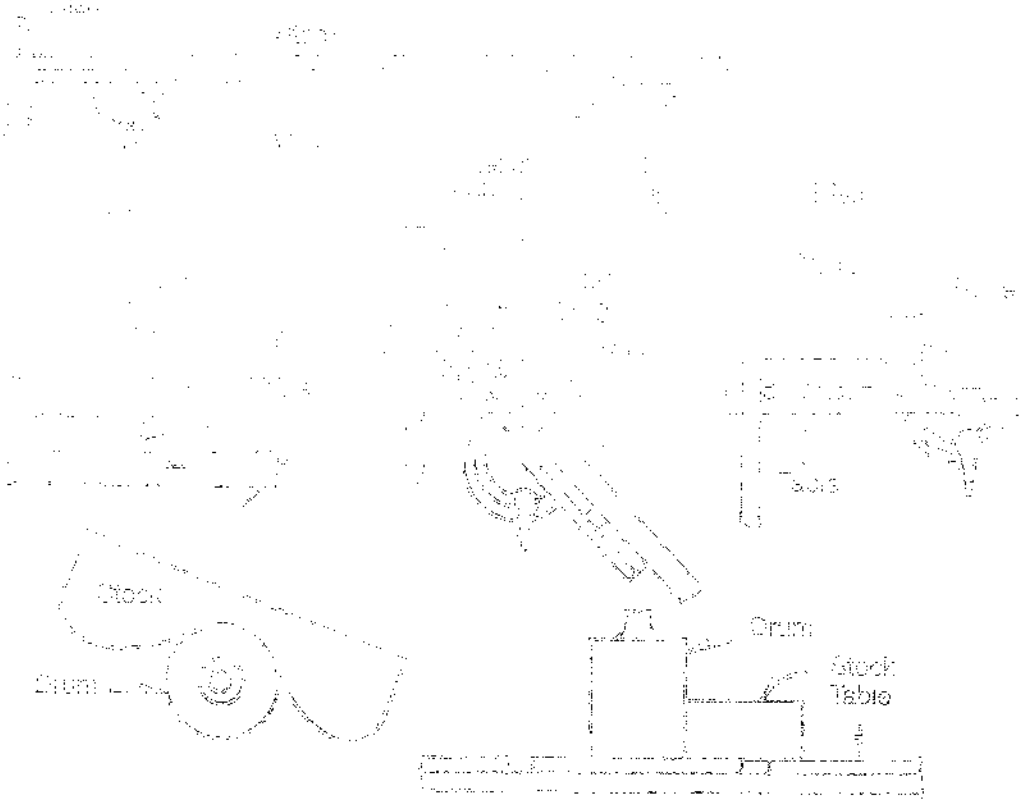
TRUE OR FALSE: Circle your selection.

T F 1. Mortise should have tapering sides to make a tight fit with the tenon.
T F 2. When forming a round end mortise, holes should be drilled one after the other along the [illegible]
T F 3. The approximate distance the quill of a drill press can be extended is 4 inches.
T F 4. [illegible]
T F 5. The holes in a dovetail miter joint are drilled at a [illegible]
T F 6. Holes or dovetails in a pegged joint are bored in [illegible]
T F 7. A [illegible]
T F 8. [illegible]
T F 9. Cutting holes in glass is best done with a twist drill bit.
T F 10. [illegible]
T F 11. [illegible]

ASSIGNMENT 42

DESCRIPTION:

The [illegible] sanding. Work is run between sanding or drum sanding should be governed by the size and [illegible] the [illegible] and the density of the stock. Coarse grit should be utilized in the case of hard materials and the sanding angle reduced. The grit of the disc or sleeve used should be carefully related to density of the material [illegible] the rougher the [illegible] and the rougher the [illegible] and clogs more easily.

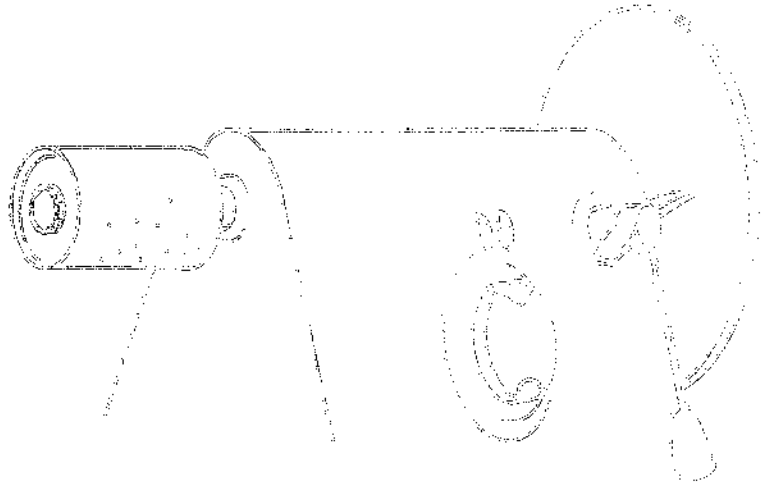


LESSON 7
ASSIGNMENT 42

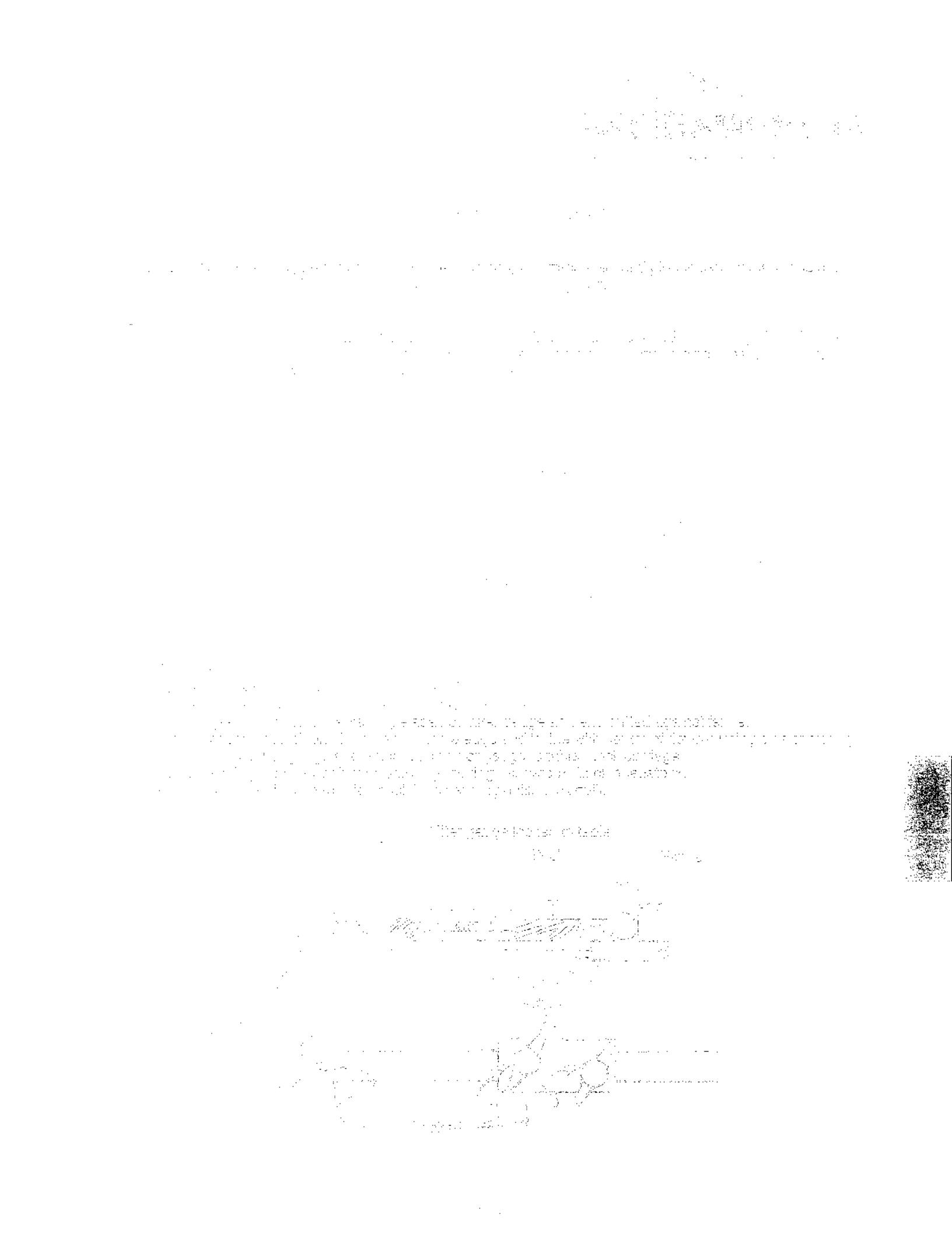
USE:
The correct selection of sanding method and adjustment and abrasive for [illegible] sanding.

OPERATIONS:
1. Provide 12" disc; one medium grit sanding disc (Optional: drum sander, drum sander [illegible] coarse sanding disc.
2. Mount abrasive paper to sanding disc.
3. Optional: a) Apply double faced paper to [illegible] auxiliary spindle [illegible]

4. Optional: a) Remove and replace sanding sleeve on [illegible] drum sander. b) Replace sanding disc [illegible] auxiliary spindle with drum sander.

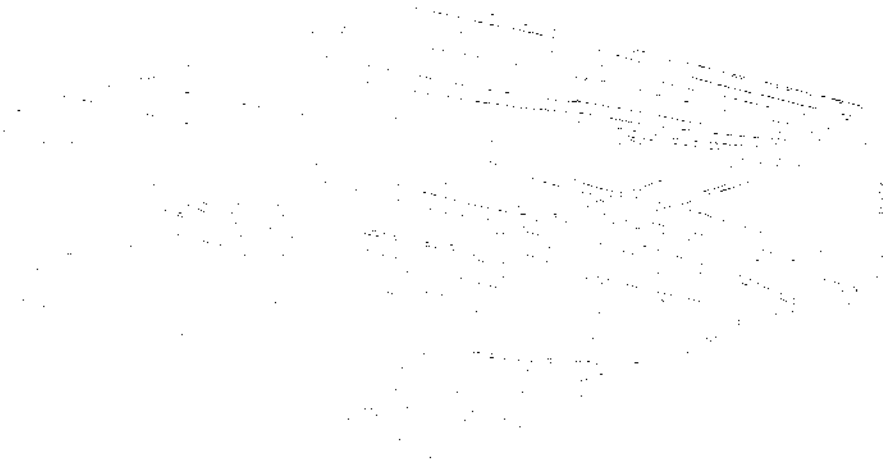


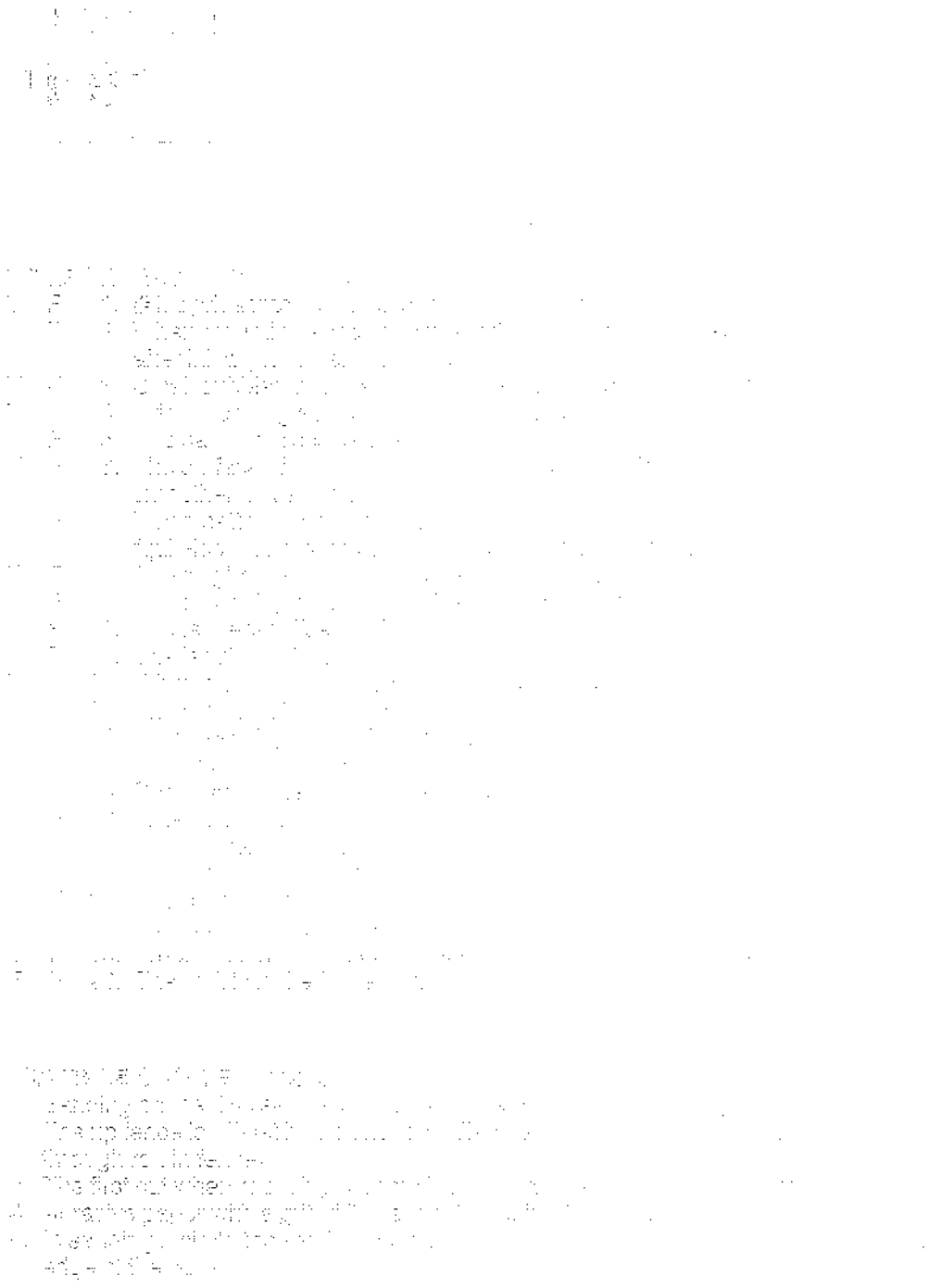
ASSIGNMENT 4.3



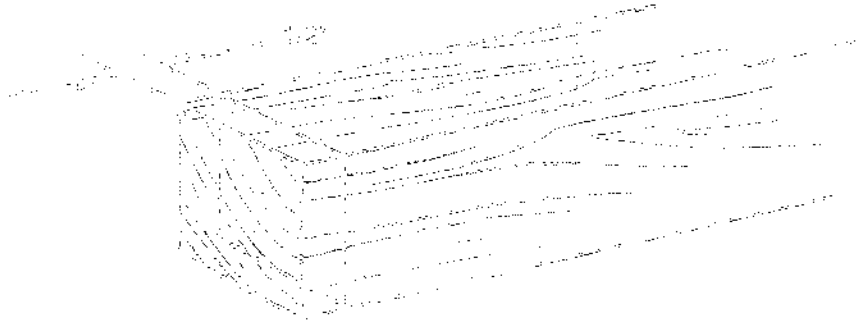
ASSIGNMENT 45

angles.



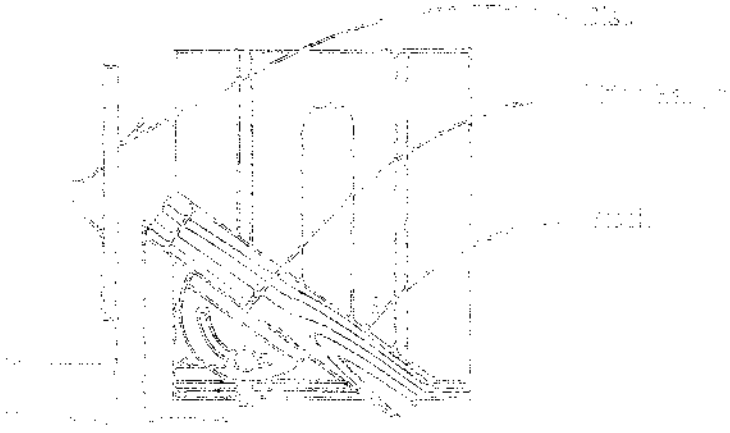


ASSIGNMENT 49

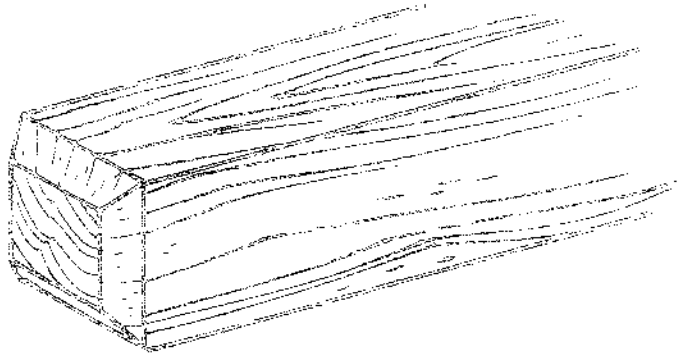


LESSON 8
ASSIGNMENT 49

3. Set miter gauge at 45° right and place in left table slot.
4. Place stock on table, marked end toward sanding disk and edge butted against miter gauge.
5. Position the edge to be sanded one inch beyond edge of table and in line with down turning side of disk by adjusting stock, miter gauge, and table. Lock carriage.
6. Position abrasive paper ¼" from edge of stock by adjusting [illegible].



7. [illegible]
8. Repeat operation 7 on the remaining three edges.

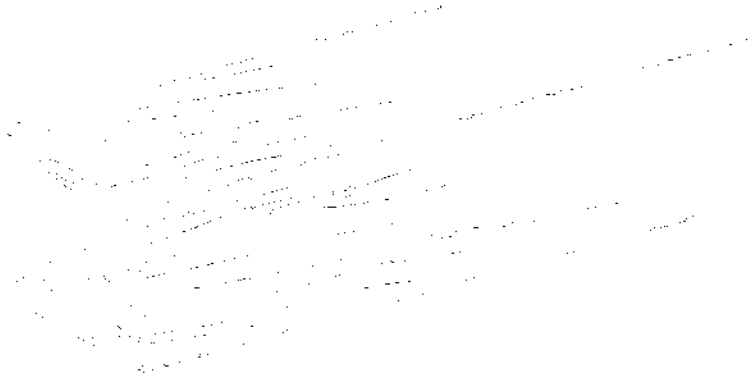


LESSON 8

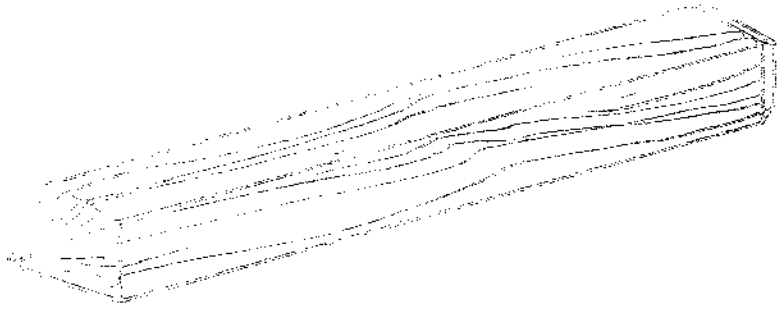
ASSIGNMENT 49

[illegible] provides positive grip strength. Facilitates firm positioning of stock while [illegible]

[illegible] at the other end of stock. Lightly punch mark the intersection.



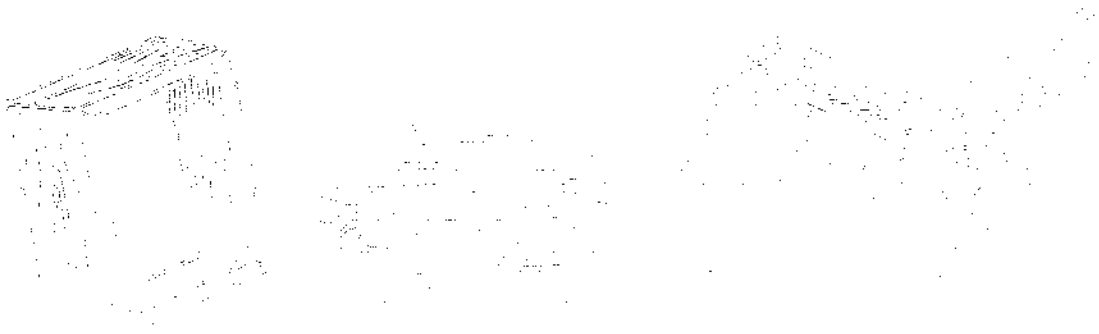
[illegible]



LESSON
ASSIGNMENT

DESCRIPTION:
Bevels are like chamfers but the entire edge is cut to an angle. Bevels are used for decorative purposes and must be smooth with sharp edges. Bevels are cut on the same machine settings as chamfers except for miter gauge and fence position.

USE:
Bevels are primarily used to [illegible]

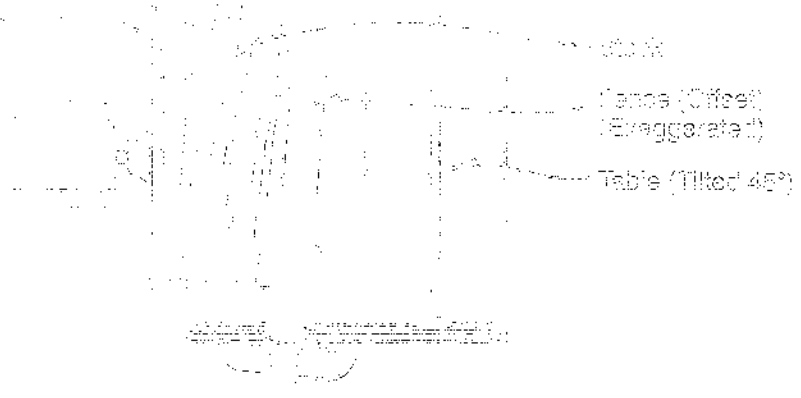


Operation:
Let us bevel one end and one edge of the piece.

1. Prepare a piece of stock [illegible]
2. Lock carriage at the right end of [illegible]
3. Set miter gauge at 90° and place it [illegible]
4. Position end of stock [illegible] left edge of [illegible] gauge.

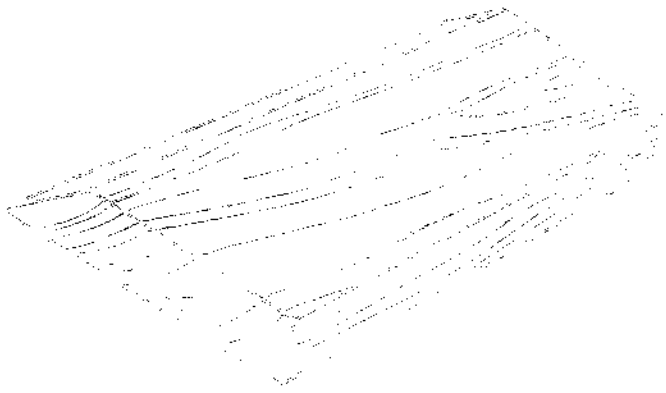
Note: Position stock to overlap table an amount that leaves the protective guard just clear of the edge of the bevel is completed. The undercut table edge permits [illegible] overlap prevents shattering of work piece [illegible]

5. Feed sander into stock until bevel is formed.


Fence (Offset)
(Exaggerated)
Table (Tilted 45°)

LESSON 8
ASSIGNMENT 50

13. Set depth gauge on 1/8" mark and lock. Release quill. Advance quill to depth stop and feed cutter through stock through from the rear.
14. Repeat Operation 13 above until bevel is formed.

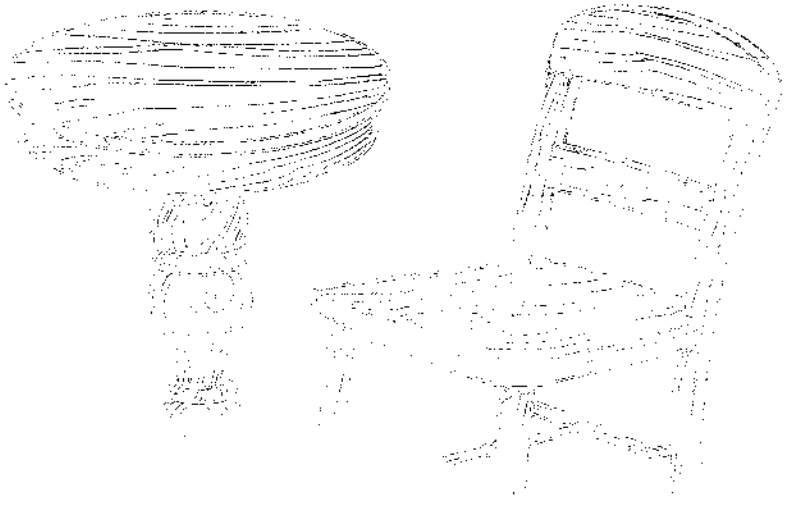


LESSON 8
ASSIGNMENT 51

HOW TO SAND OUTSIDE CURVES

DESCRIPTION:
1) "Inside" or convex curves can be sanded to finished form using the sander providing the work piece can be turned or adjusted to bring the full length of the curve into contact with the abrasive.

USE:
Common convex curves requiring sanding are found in oval or round tables and bench tops; arms, legs, and backs of chairs; parts of tables, desks, cabinets, lamps, and wood ornaments.

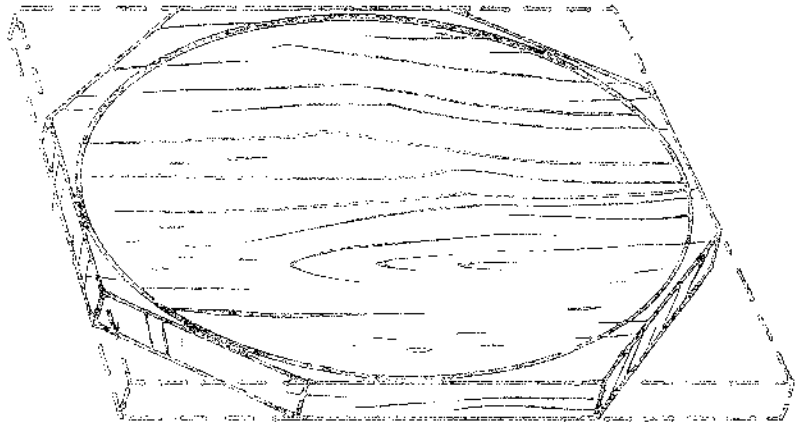


DEMONSTRATION:
Let us sand the edge of an oval table top.

1. Prepare a piece of stock 3/4" x 11" x 20".
2. Scribe an oval on one side.

Note: Use of an oval paper pattern centered on the side helps assure accuracy.

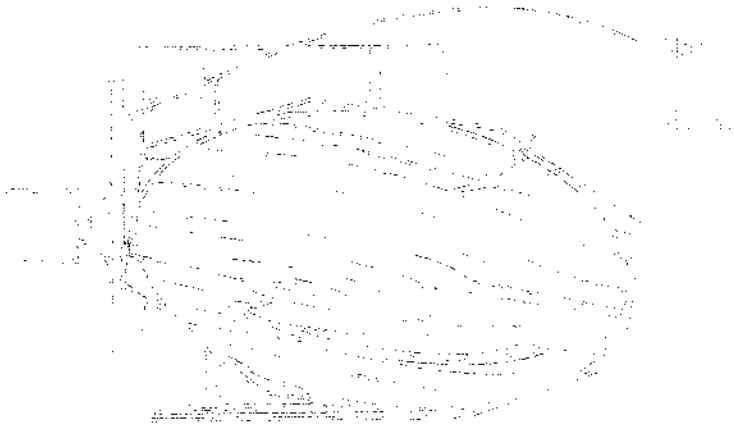
3. Cut stock to approximate shape (about 1/8" from the outline) using a scroll or keyhole saw. If available, a jigsaw or bandsaw quickly reduces stock to a size and shape which requires minimum sanding. If necessary, you can use the table saw to remove most waste stock. See sketch below.



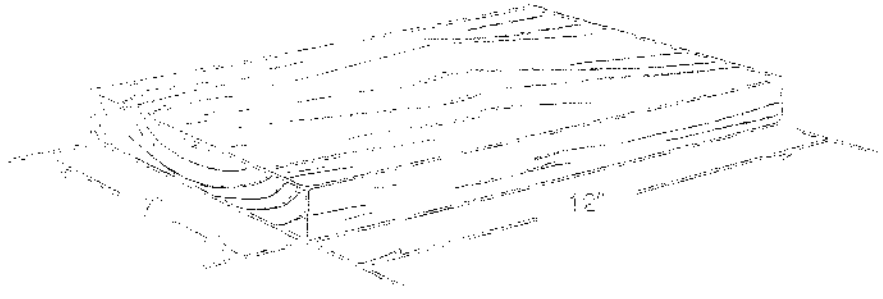
LESSON 4

ASSIGNMENT 11

4. Commence bending at a point which will permit convenient handling of stock in bending. Use [illegible] advance and retain number of [illegible]

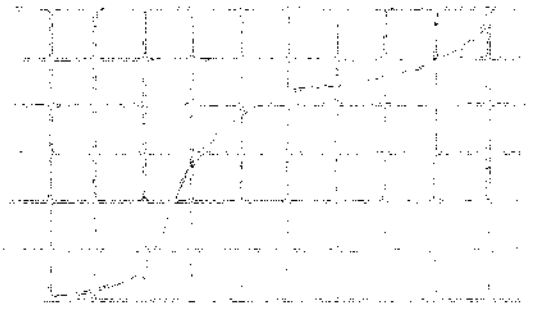


ASSIGNMENT 52



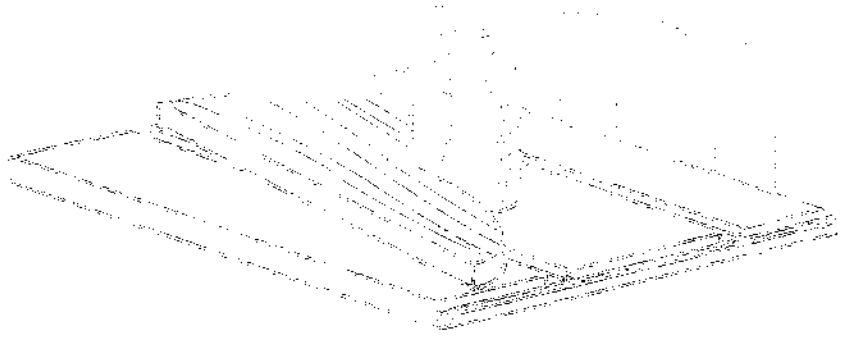
LESSON 8
ASSIGNMENT 52

2. Outline a shelf bracket on one side of stock. Also lit is design if you wish.



Note.
Square

1. Rough out the shape using [illegible] saw, [illegible] or bandsaw.
2. [illegible]
3. [illegible]
4. [illegible]



Now let us sand the inside curve of a Cabriole Leg. (Hand filed.)

1. Prepare a piece of stock 1-1/2" × 1-1/2" × 12"

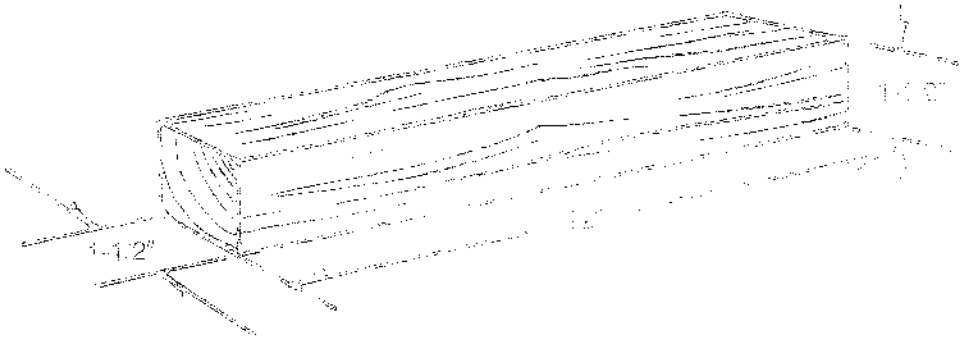


EXHIBIT 52

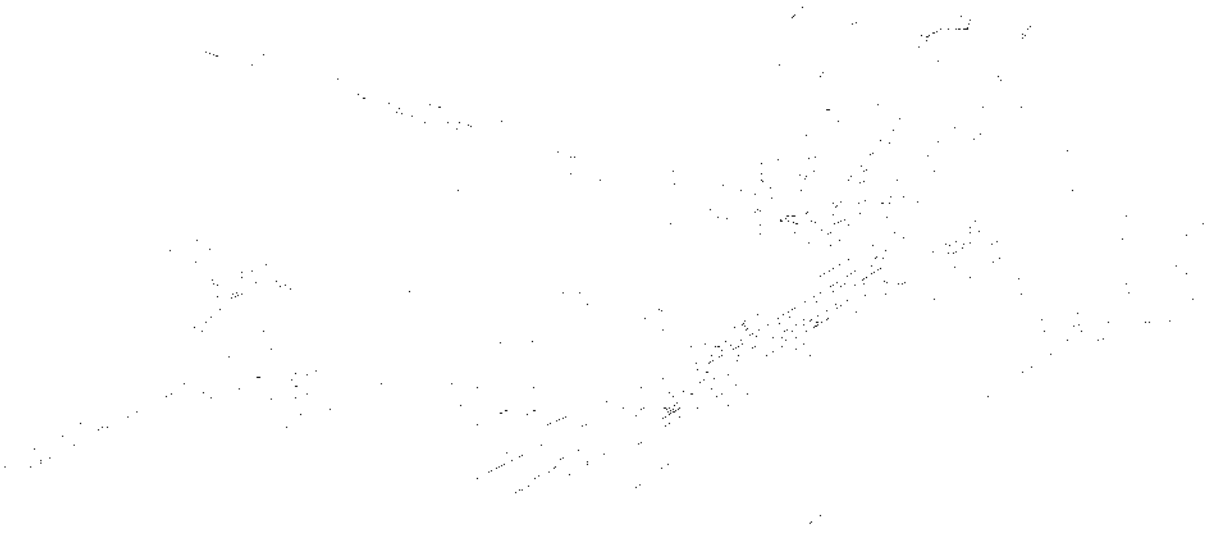
ASSEMBLY

ASSEMBLY

Oversize sanding [illegible] before operating [illegible] adjusted to permit [illegible]

Fig.

[illegible]

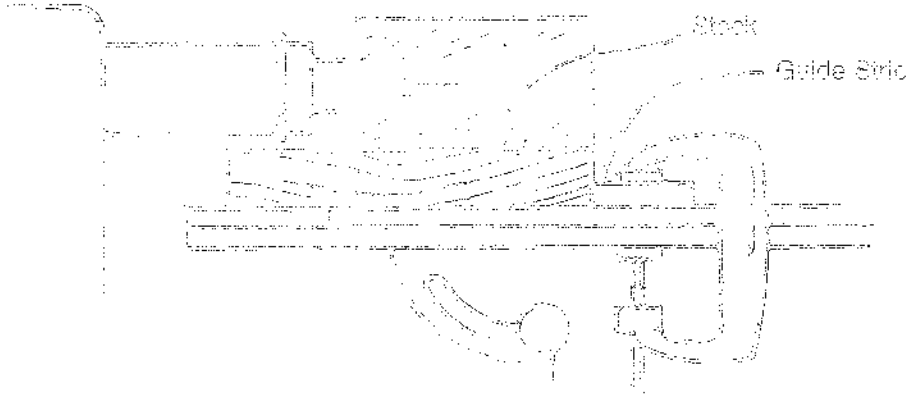


OPERATIONS:

Completion of [illegible]

Let us examine [illegible]

1. Prepare one piece of stock 6½" × 6" × 1½" and another 2" × 2" × 2".
2. Set Mark V in horizontal [illegible]
3. Extend quill 4" and lock.
4. Place stock flat on table [illegible] parallel to slot, and 1/8" from right edge of sanding drum.
5. Adjust table height [illegible] Remove stock.



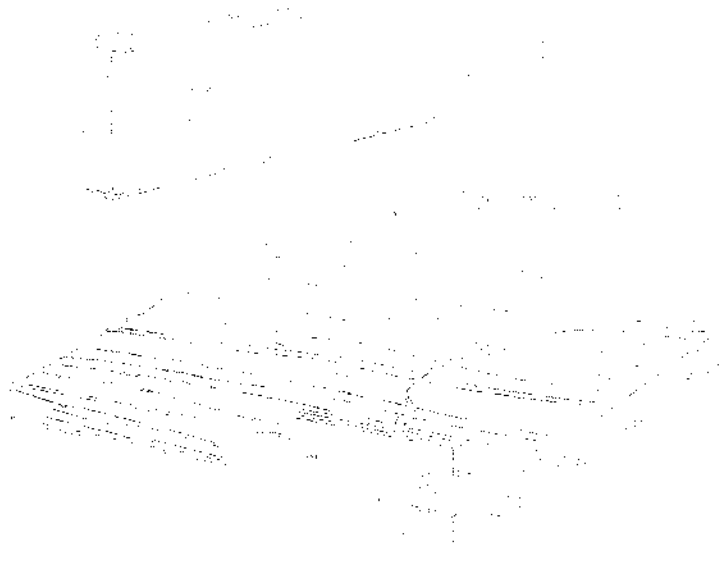
ASSIGNMENT

DESIGN [illegible]
Sheet can be secured [illegible]
system [illegible]
as [illegible]

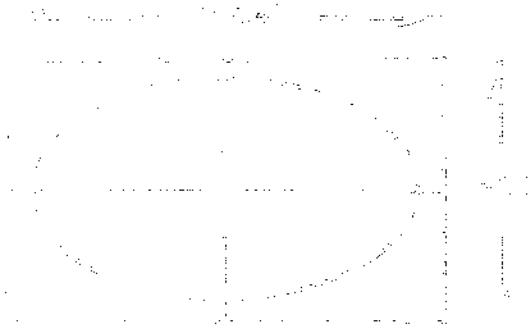
[illegible]
[illegible]
[illegible]

OPERATION
Let us sand stock [illegible]

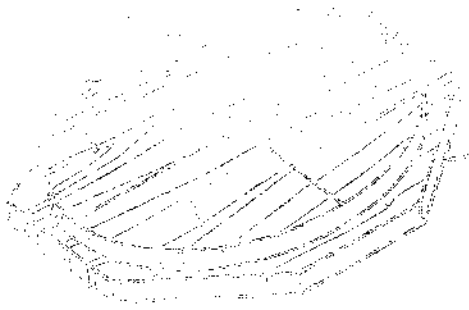
1. Prepare sandstone as follows:
   a) For temporary [illegible]
   b) For [illegible]
   c) For finished [illegible]
   d) For guide— [illegible]
2. Drill screw holes in metal [illegible]



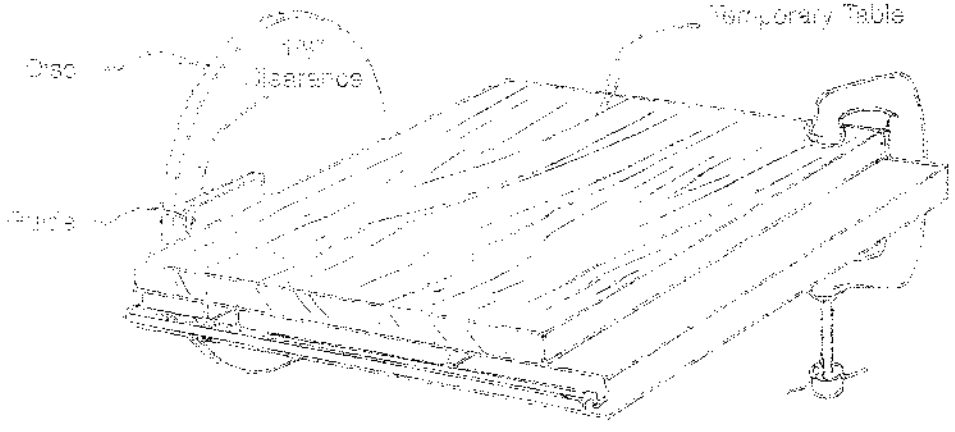
5. Duplicate [illegible] pattern sketch. Draw the curve with dimensions that are 3/4" less than required in the finished workpiece. For this operation make long axis of pattern 10-1/4" and short axis 6-1/4".



[illegible]

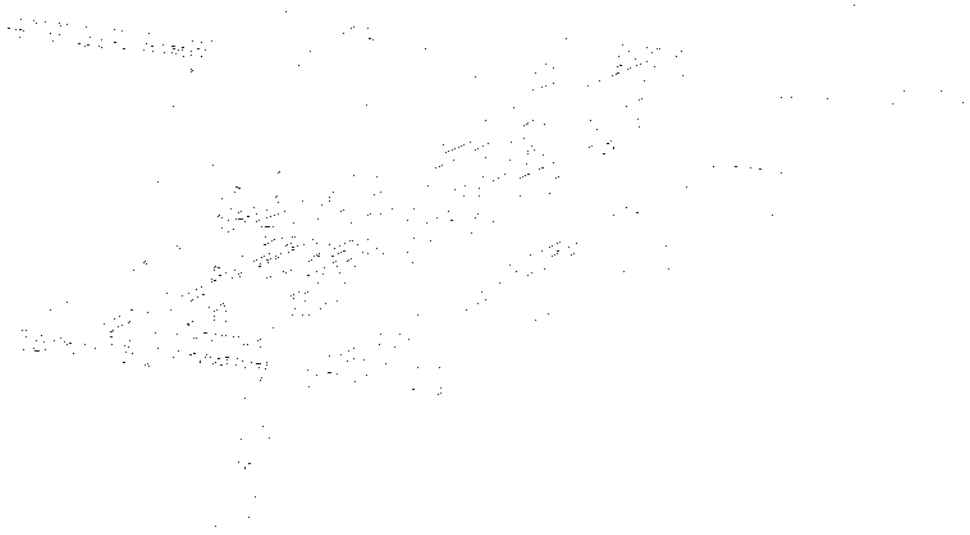


8. Clamp temporary table to main table. Position outside surface of metal guide strip outside the edge of main table, in line with corner of down-turning side of sanding disc, and 1/8" from it. Lock carriage and headstock.



7. Turn on motor. Feed pattern and stock into sanding disc with pattern on [illegible] side of disc. Maintain contact between pattern and strip while moving stock [illegible]

GENERAL



[illegible]

[illegible]

[illegible] a smooth, finished appearance.

[illegible]

[illegible] gauge safety grip.

[illegible] the four edges at that end.

[illegible] of sanding disc.

[illegible]

[illegible]

[illegible] offset.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] on the front table.

[illegible]

[illegible] drum sander.

[illegible] the main table.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

22. When edge sanding, the [illegible] the end of the drum sander should be (above) (below) (even with) the surface of the table.
23. When pattern sanding, the [illegible] should be rough cut to a size that is (greater than) (equal to) (is less than) the size of the pattern.
24. When [illegible] the carriage is usually set at the (right end) (center) (left end) of the tables.
25. When surface sanding [illegible] the disc sander the quill is first set (fully retracted) (extended one [illegible]).

Stock is turned on a lathe. A piece of [illegible] is mounted between the headstock and tailstock centers. The cup center on the headstock drives the stock. The tailstock center supports the stock.

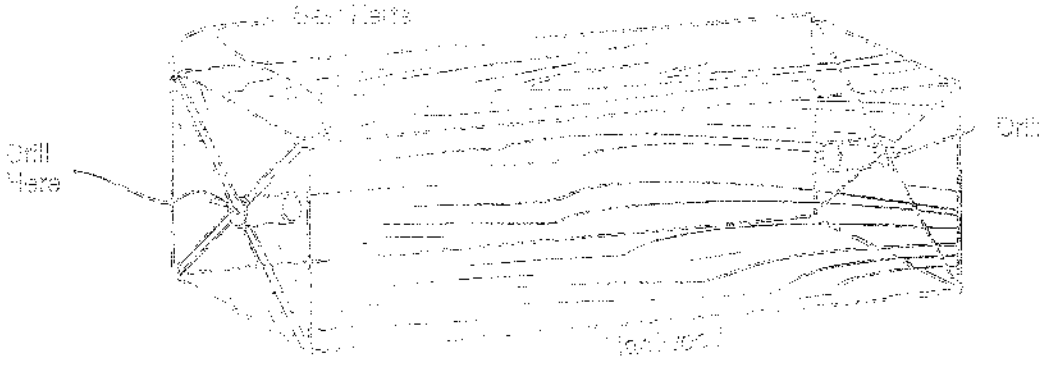
[illegible]

[illegible]

Note: Use straight grain redwood or pine for any medium-soft wood) is recommended.

2. Scribe diagonals on each end to punch mark the intersections.
3. Using wood mallet (or equivalent), drill halfway in the center hole on each end of stock until the center will stand, unsupported. Spurs must penetrate at least [illegible] into stock.

Note: When mounting [illegible], drill 1.8" diameter holes 1.4" deep at the punch marks. Cut grooves 1/8" deep on the diagonals at one end using a hacksaw.



LESSON 9
ASSIGNMENT 55

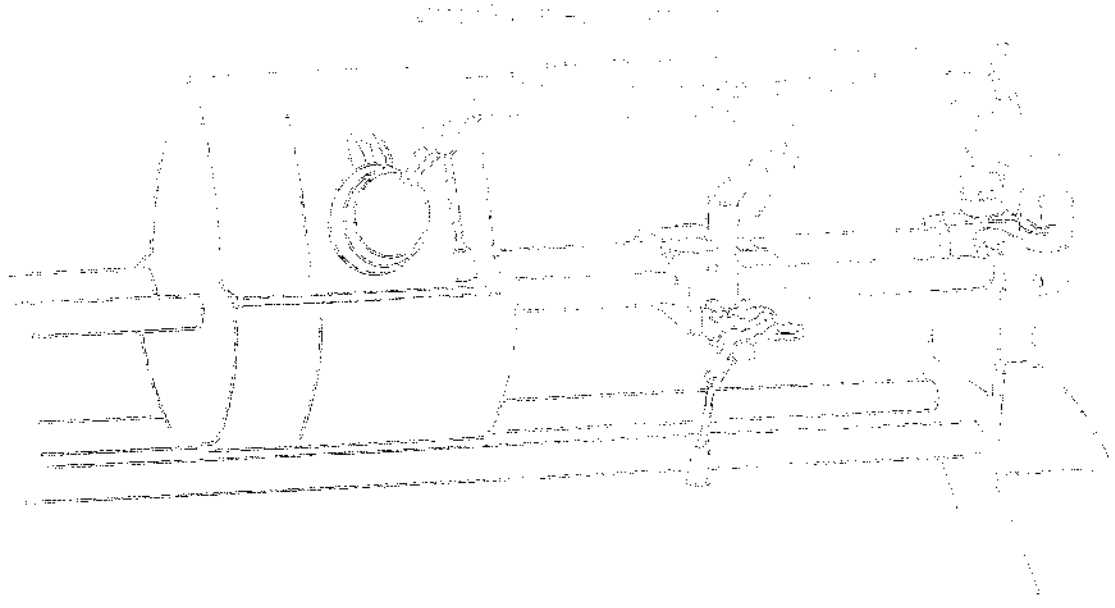
4. Set Mark V in Lathe position with tool rest arm inclined to the right.
5. Set and lock headstock to provide 14" between centers.
6. Set end of stock marked with punch mark only in point of live center. Force tailstock quill lever to firmly seat both centers. Centers must penetrate at least 1/16" into both ends of stock. Lock quill.

WARNING: The spurs of the drive center and the [illegible] must penetrate at least 1/16" in order to [illegible] or slip center if the point is worn [illegible].

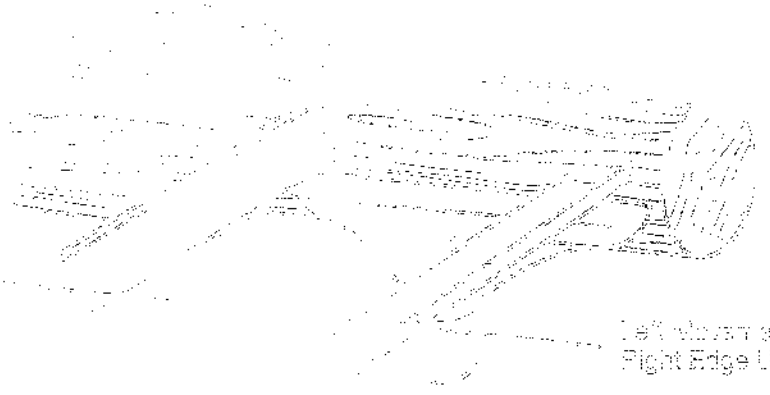
7. Turn stock to position two edges in the horizontal plane.
8. Set tool rest slightly above level of [illegible] (See illustration top page 195 of textbook.)

WARNING: [illegible] position from [illegible] point. Before turning [illegible] and [illegible].

Note: Study your Owner's Manual [illegible] headstock [illegible].



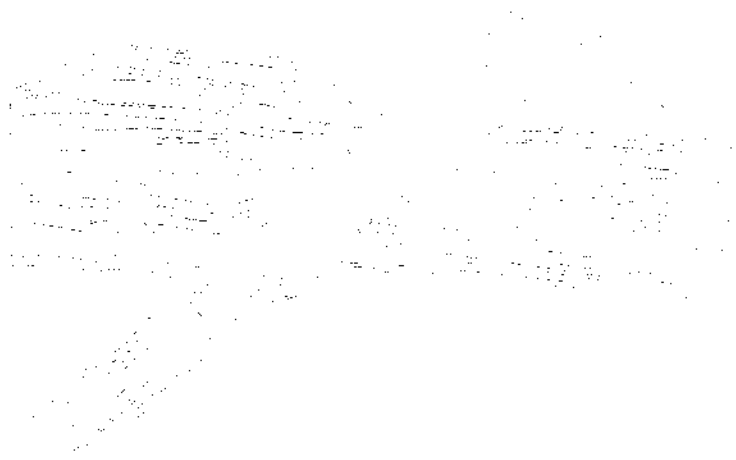
ASSIGNMENT 56



ASSIGNMENT

5. Slowly advance the [illegible]

Note: The section of the [illegible] round when stripped. [illegible]



6. When the desired [illegible] full length of stock is rough turned to a diameter of [illegible]

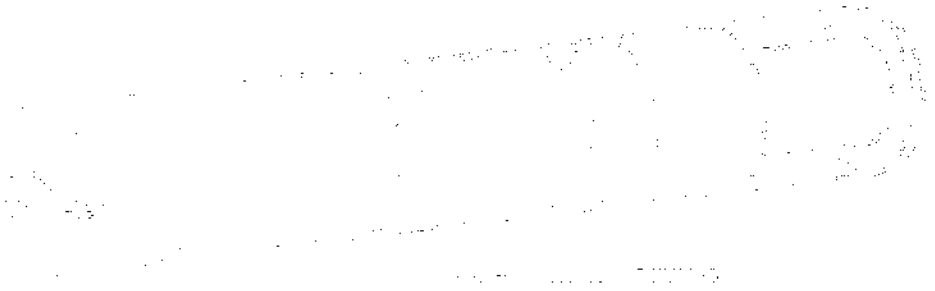
Note: Stock can be rough turned with a [illegible] position and then sliding the [illegible] of the cutting edge which lengthens the [illegible]

ASSIGNMENT 57

[illegible]

[illegible]
Square out stock to [illegible] specific diameter by [illegible] the final width shown.

[illegible]
[illegible] the largest diameter.



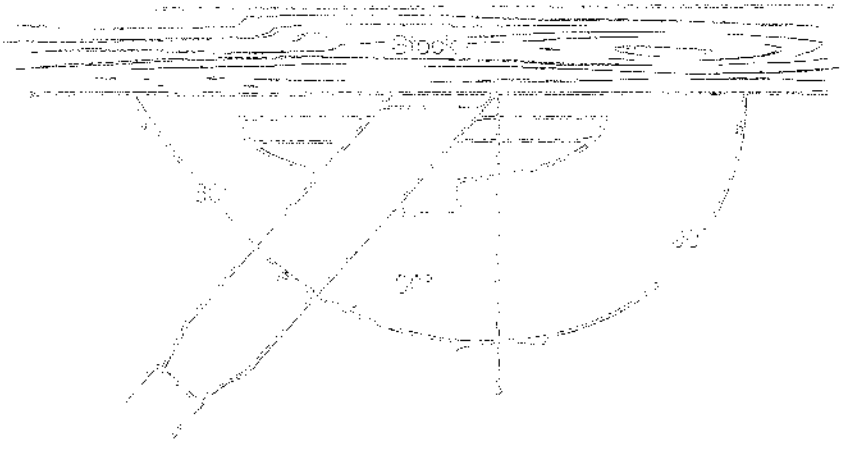
[illegible]

[illegible] with [illegible] gouge.
2. Check the diameter using [illegible].
3. Do the finished diameter [illegible] gouge is rotated to provide the shearing cut shown on page 193 of textbook.

Note: The shearing cut produces smooth [illegible] when the cutting edge is presented horizontally.

4. Start cutting with gouge when the diameter is 1 1/4".
5. Reduce stock to 1-1/2" diameter using a skew.

Note: Use the skew in position which gives a [illegible] action. (See pages 187 and 193 of textbook.)



LESSON 9
ASSIGNMENT 57

6. Position tool rest at right end of stock and with edge in line with [illegible]
7. Make a light shearing cut between [illegible] (See page [illegible] of textbook.)

Note: Do not permit point of skew to penetrate the stock. Remove wood with the [illegible]. Depress the handle to decrease depth of cut. Raise handle to increase depth of cut.

LESSON 9
ASSIGNMENT 58

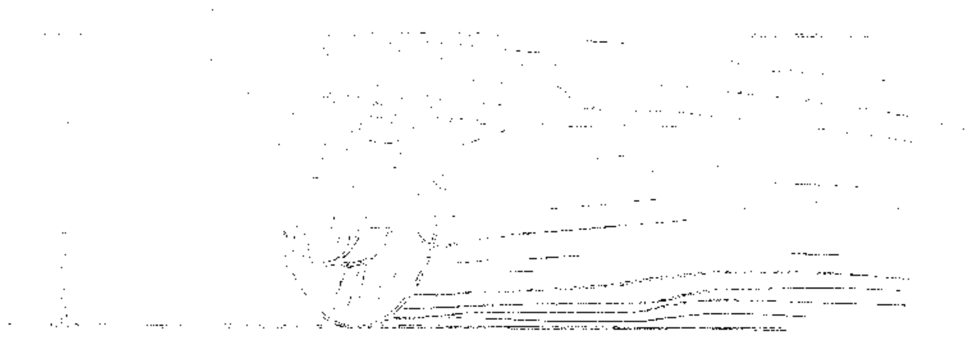
HOW TO MAKE PARTING CUTS

Information:
Cuts made into the turning stock, which cut or part the grain of the wood, are parting cuts. The parting tool has a narrow cutting edge and is usually used in a scraping action.

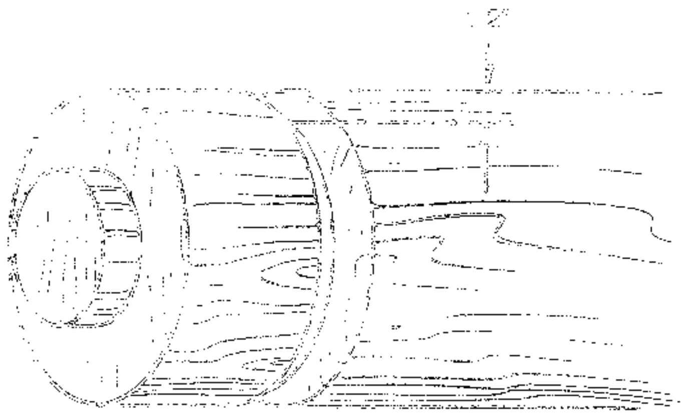
Use:
Parting cuts are used to [illegible] shoulders, cut offs, clean or square the ends of stock [illegible] (See text page 190 and illustration page 191 of textbook.)

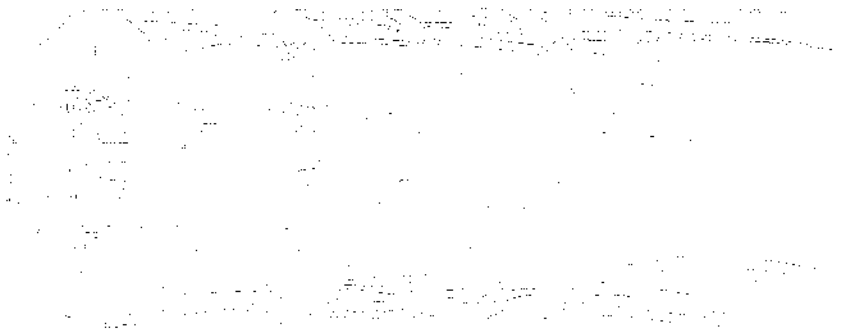
Learning Steps:
[illegible]

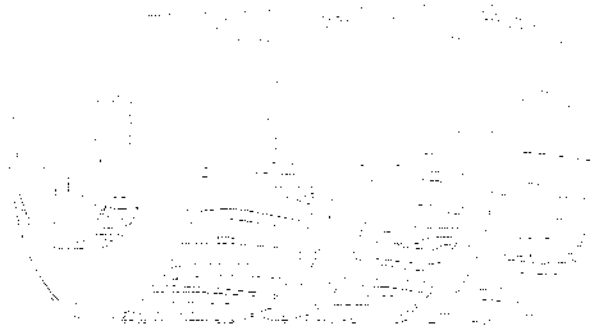
1. Mount the cylinder made in Assignment 57 between lathe centers and turn on motor.
2. [illegible]
3. [illegible] the cutting edge of the tool.



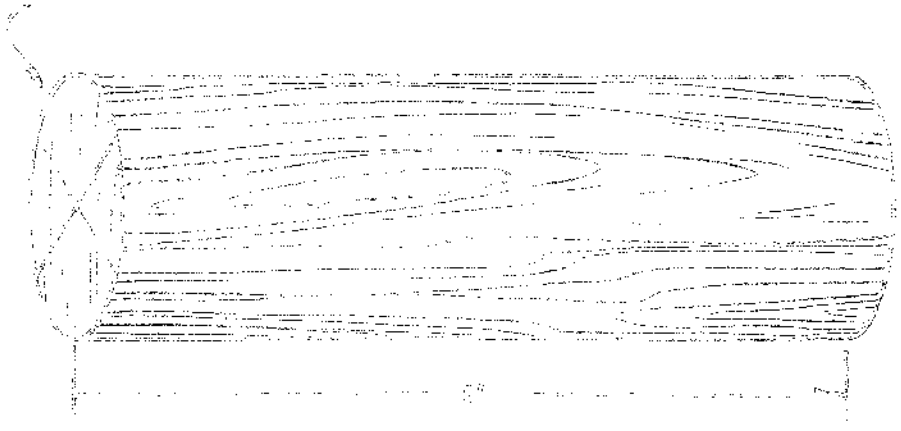
4. Cut a [illegible] the flank of the shoulder having a depth of 1/2".





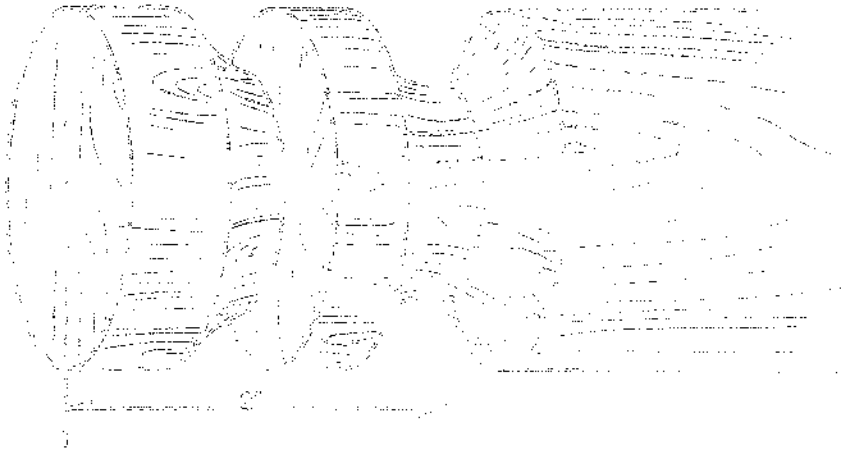


Note: Save the uncut stock for use in next assignment. Use a center punch and punch mark the center of the cut off end. Repeat the drive center.

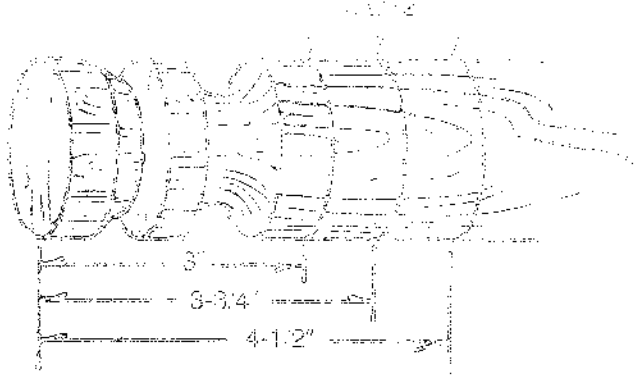


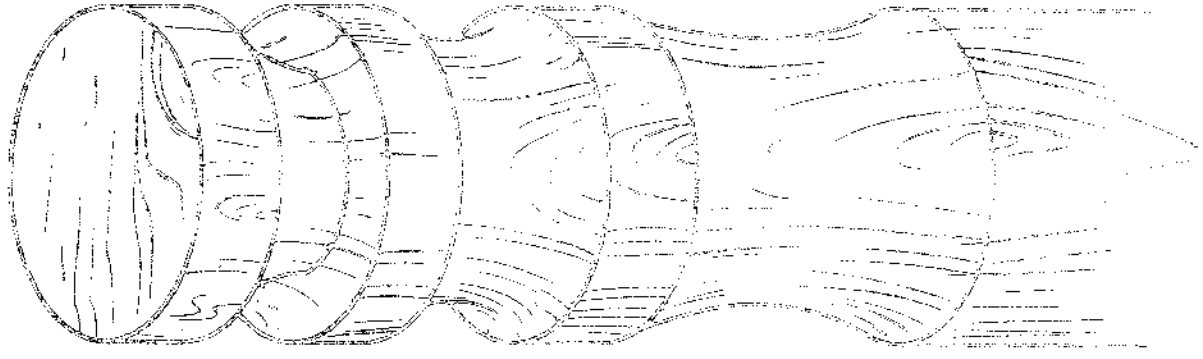
LESSON 9
ASSIGNMENT 59

3. Scribe a line 2" from left end.
4. Part the stock at pencil line to a depth of 1/2".
5. Using 3/4" gouge in horizontal position [illegible]



6. Scribe [illegible]
7. [illegible]
8. [illegible]





Note: Save stock for use in next assignment.

ASSIGNMENT 60

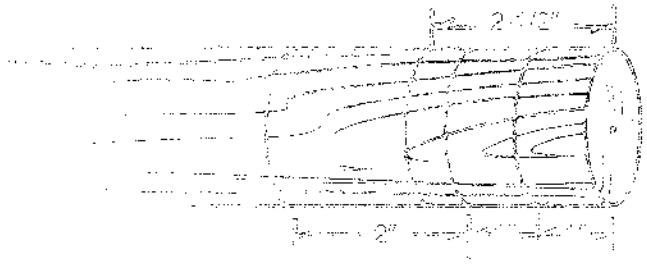
[illegible]

[illegible] interior of a ball. Such units can be formed in cylindrical [illegible]

[illegible] convex, the majority of curved pallets [illegible]

[illegible]

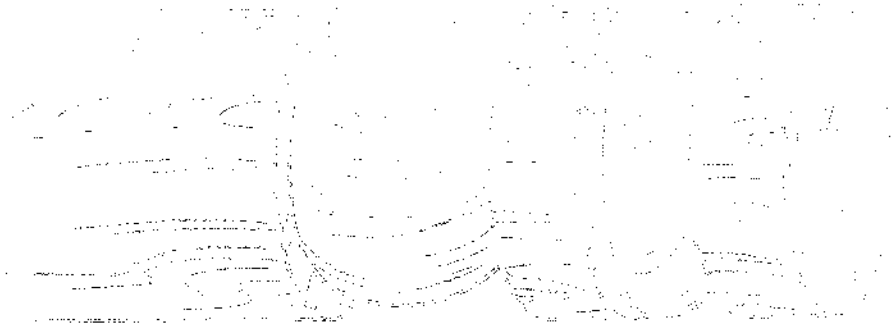
[illegible]
[illegible] edge level with the center line of stock.
[illegible] 2" from right end. See next page.



ASSIGNMENT 01

4. Part the stock at pencil lines to a depth of 1/2".
5. Using the skew, cut a bevel between the [illegible]

[illegible]

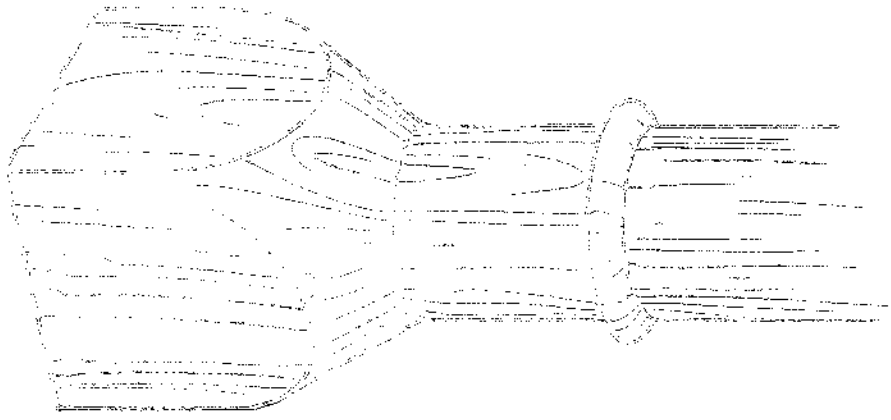


LESSON 9
ASSIGNMENT 61

HOW TO ROUND OFF SQUARE CORNERS

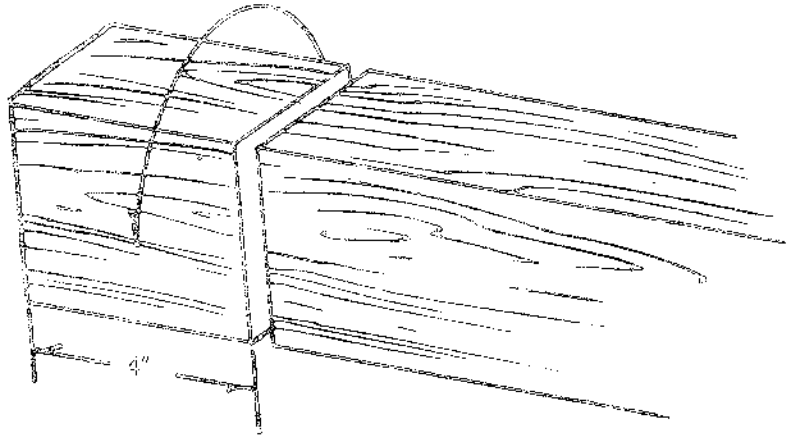
DESCRIPTION:
Patterns which combine flat and curved surfaces usually blend the two where they meet by rounding the square corners. The corners formed by cutting the edges of square stock turning between centers can be rounded with a skew.

USE:
Rounding the square corners at the point where the flat surfaces become curved is done primarily for decorative purposes. Such rounding serves the additional purpose of making the pattern more durable by avoiding chipping.



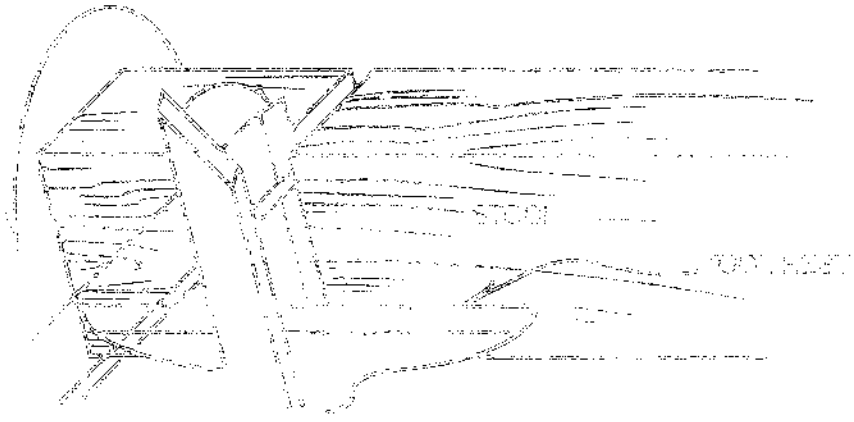
OPERATIONS:
Let us round the corners on a section of square stock.

1. Prepare a piece of stock 1-1/2" × 1-1/2" × 14".
2. Mount stock between centers. Position tool rest at left end of stock, check for clearance and turn on motor.
3. Place edge of skew on the tool rest, **heel** up and cutting edge vertical. The "heel" is the shortest edge.
4. At a point about 4" from the left end, feed the cutting edge into the stock to a depth of 1/4". (Approximately equals the width of bevel on skew.)

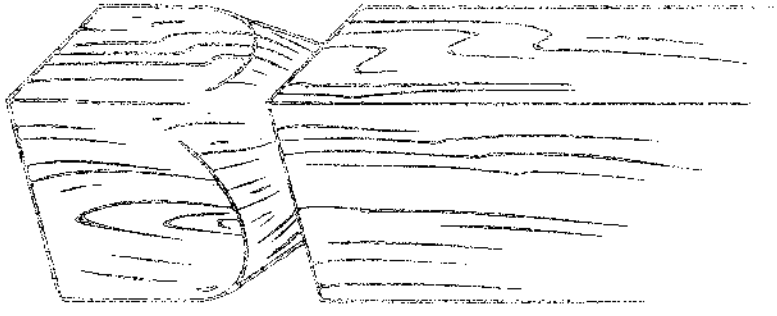


LESSON 9
ASSIGNMENT 61

5. Place skew on tool rest with heel down, cutting edge vertical and about 3/4" to the left of center line of "V" cuts.
6. Incline cutting edge 45° to the left. Hold blade of skew in firm contact with tool rest using the left hand. With the right hand, lower handle of skew and swing the end to the right.



7. [illegible] cutting edge, heel leading, down and to the right. Make [illegible] shown above.
8. [illegible] to the left [illegible] the same as [illegible] for cutting [illegible] the bevel.



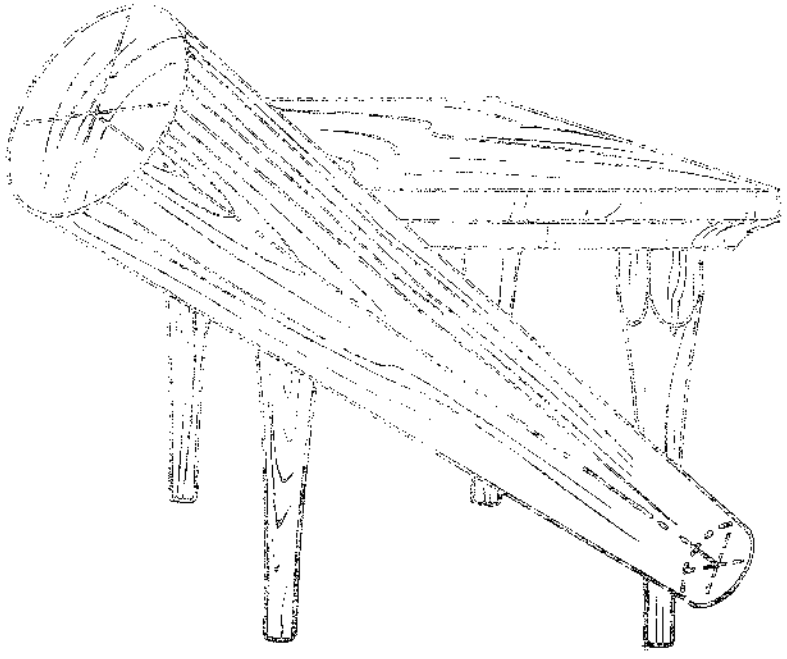
Note: Save stock for use in next assignment.

LESSON 9
ASSIGNMENT 62

HOW TO TAPER

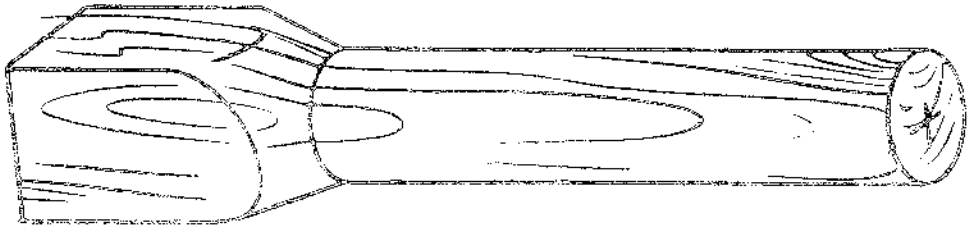
DESCRIPTION:
A taper is cut in cylindrical stock turning between centers by reducing the diameter progressively between any two points on the axis of the stock.

USE:
Tapers are cut primarily for decoration. They are very frequently cut in the legs of tables and chairs of modern design.



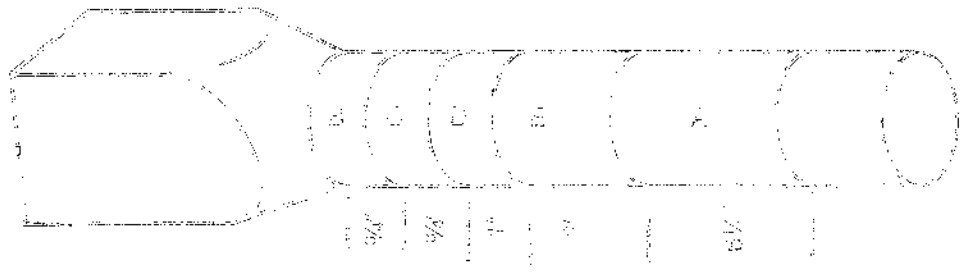
OPERATIONS:

1. Mount the stock used in Assignment 62 between centers.
2. With a gouge, rough turn to a cylinder between right end and center line of "V" cut.
3. Size the cylinder to 1-1/4" diameter. The stock should now appear as follows:



LESSON 9
ASSIGNMENT 62

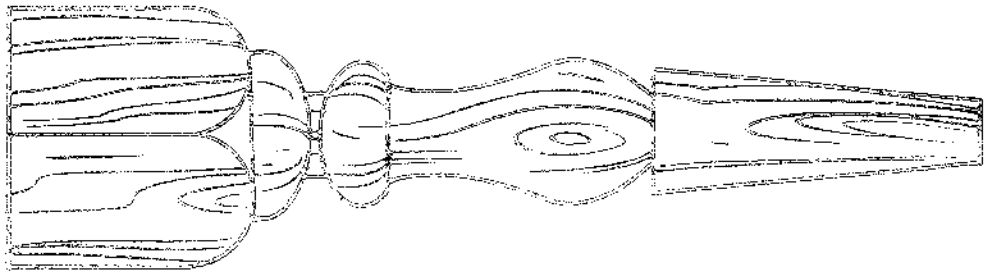
4. Portion the surface of stock by scribing lines at the points indicated in sketch below.



5. Turn mount stock. Offset dead center by rotating 90° to the right. Raise tailstock to bring dead center to same height as drive center. Remove live stock, square end to the left.
6. Cut tapers in section A.
7. Sand surface of taper.

Note: Hand holding abrasive disc mounted on disc sander produces a smooth surface.

8. Plane stock to a depth of [illegible]
9. Turn curves as follows:
   Portion E - 1/4 circle, outer ex
   Portion D - full bead
   Portion C - Concave
   Portion E - Convex
10. The stock should now appear as follows:



LESSON 6
TEST

TEST QUESTIONS ON LESSON NO. 6

TRUE OR FALSE: Circle your selection.

T F 1. The cup center rotates with the stock.
T F 2. Centering the stock prevents excessive vibration when rotated.
T F 3. The drive center is driven into the stock with a wooden mallet.
T F 4. The tool rest should be set parallel with the work which saves time and trouble.
T F 5. It is not advisable to rotate the stock by hand before initial turning by power.
T F 6. Rough turning of square stock should be commenced using slow speed.
T F 7. In making the first cut for roughing down work, the cuts should be light.
T F 8. When rough turning, the steadiness of the lathe is dependent on the rigidity of the bed, the driving stock.
T F 9. The surface of cylindrical stock can be smoothed with a skew.
T F 10. When rough turning, the gouge is rotated to increase the rate of waste removal.
T F 11. Outside calipers can be used to determine the diameter of cylindrical stock.
T F 12. When using a gouge, scraping a fillet will result in a smoother, better-looking cut.
T F 13. The blade of the skew should be set practically horizontal and the cutting edge should be used with a shearing cut to finish.
T F 14. The parting tool is seldom used in a lathe operation.
T F 15. Concave cuts are usually made with a skew.
T F 16. The center of a non-paying work in cylindrical shape is nearer the longitudinal axis of the stock than the ends.
T F 17. A bead is formed by moving the tool in a curve.
T F 18. Rounding corners with a skew requires a semicircular hand movement which must be carefully timed.
T F 19. When preparing to round the corners of square stock, the skew should be held at a 45° angle with the heel of the cutting edge down.
T F 20. The amount of taper out of stock can be regulated with the eccentric in the tail stock.

MULTIPLE CHOICE: Underscore your choice.

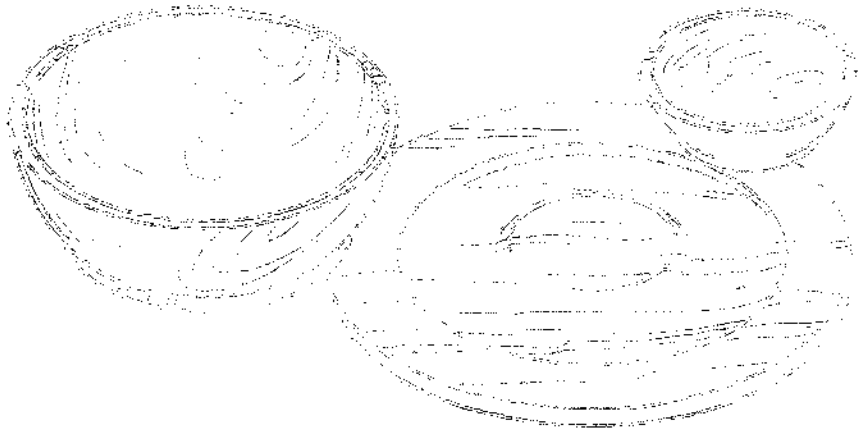
1. Stock is tightened between centers by (pushing hard on the head stock) (extending the quill) (driving stock into dead center).
2. The dead center is held in place by (set screw) (lock nut) (friction).
3. Normally, the top edge of the tool rest should be (even with) (well above) (well below) the axis of the stock.
4. To determine the diameter of a cylinder use (outside calipers) (steel square) (inside calipers).
5. The parting tool is usually used to (cut) (scrape) (shear).

LESSON 10
ASSIGNMENT 63

HOW TO TURN A SHALLOW BOWL

DESCRIPTION:
Short stock, which has large cross-sectional area, can be turned by securing it directly to a faceplate which is, in turn, mounted on the main spindle. Since the cup center is not required for this operation, the tail stock may be removed. Positioning the headstock and the carriage at the right end of the tubes, permits free access to all surfaces of the stock being turned.

USE:
Faceplate turning is used to make bowls, trays, lamp bases, boxes and similar pieces having design or weight not suited to turning between centers.



OPERATIONS:
Let us turn a shallow bowl.

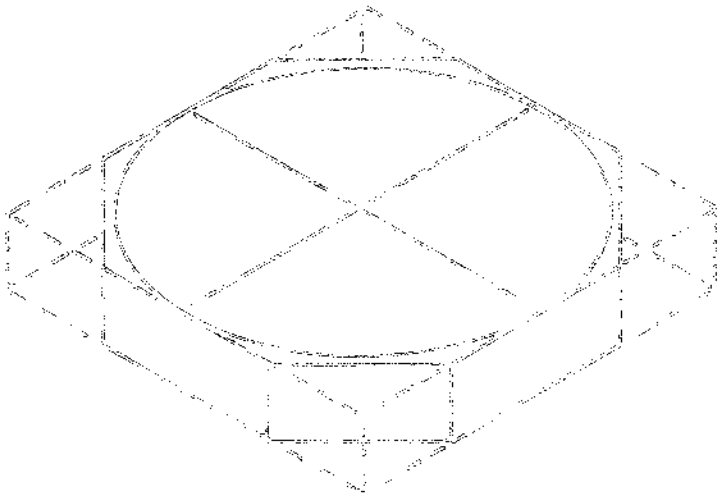
1. Prepare a piece of stock 1-1/4" × 7" × 7".

Note: Use of clear white sugar pine is recommended. A more satisfactory bowl can be made from hardwood. However, more turning and more precise processing will be required. In addition, keep chisels sharp.

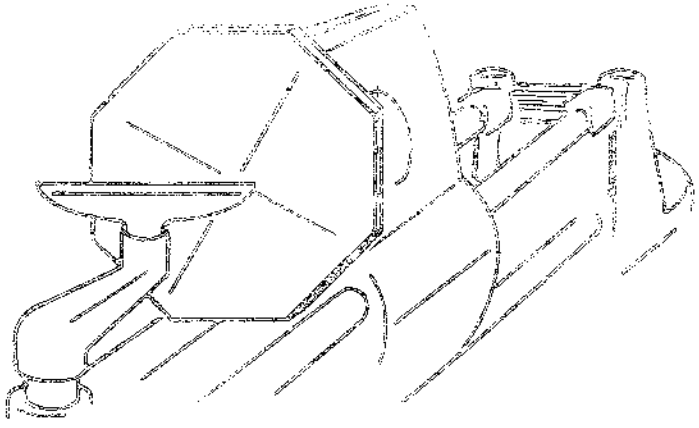
WARNING: When turning glued up stock, make sure glue joints are strong. Glue the stock and leave it clamped for at least 24 hours prior to turning.

2. Draw diagonals on one side of stock. Scribe a circle having 3-1/8" radius centered at the intersection of the diagonals.
3. Make 45° miter cuts tangent to the circumference at the four corners.

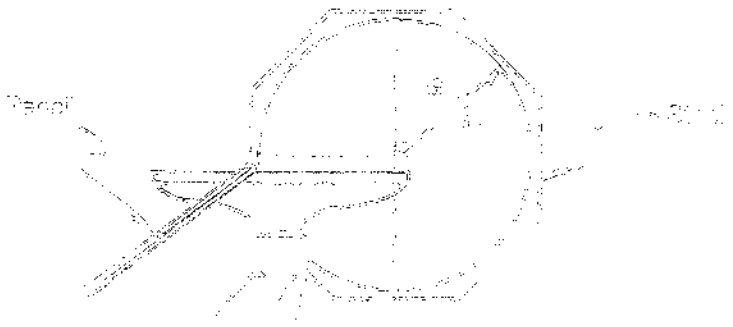
LESSON 10
ASSIGNMENT 63



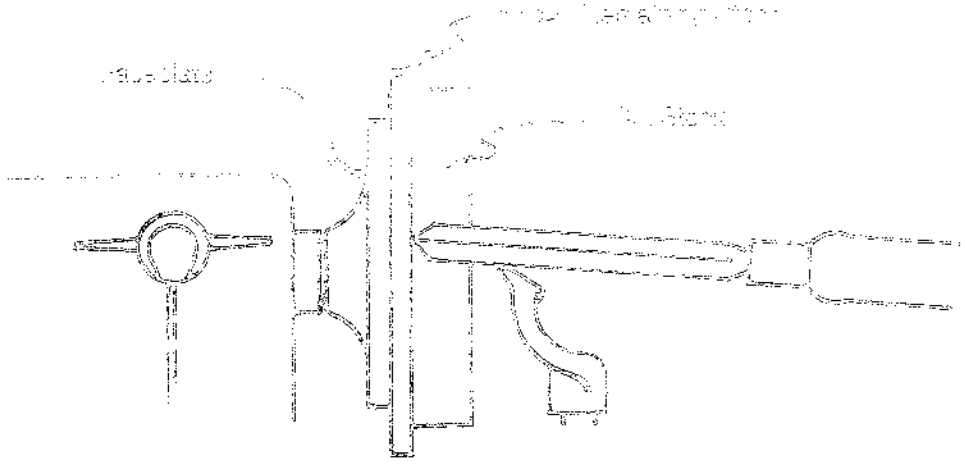
4. Center a 6-inch faceplate in the scribed circle. Punch mark the centers of the three outside screw holes. Secure faceplate to stock by driving 1-1/4" - #10 flat head wood screws at the punch marks.
5. Adjust speed setting to "SLOW". Remove tail stock. Position carriage and headstock at right end of lathe.
6. Mount faceplate, with stock attached, on main spindle. Adjust tool rest parallel to face of stock, edge no more than 1/4" from it and right and slightly beyond the center.



7. Take a light cutoff surface using the round nose chisel. Start cut at the center and slide chisel to the left. Stop motor.
8. Scribe a circle having 6-1/2" diameter by resting pencil on tool rest with point touching the stock 3-1/4" from the center and then turning stock through 360°.



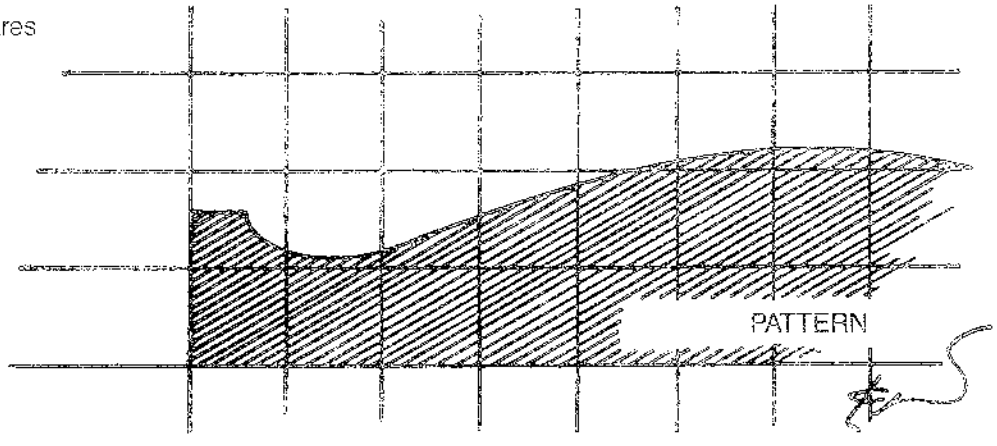
9. Turn on motor. Position parting tool with right end of cutting edge tangent to circle and feed into stock until waste wood is removed.



Note: Splintering the stock can be prevented by substituting the skew for the parting tool just before the cut is completed.

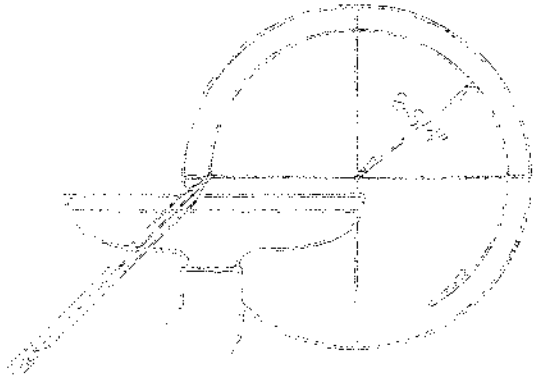
10. Cut out a cross-section pattern conforming with finished inside dimensions, using cardboard or soft sheet metal. Use this design if you wish.

Note: 1/2" Squares

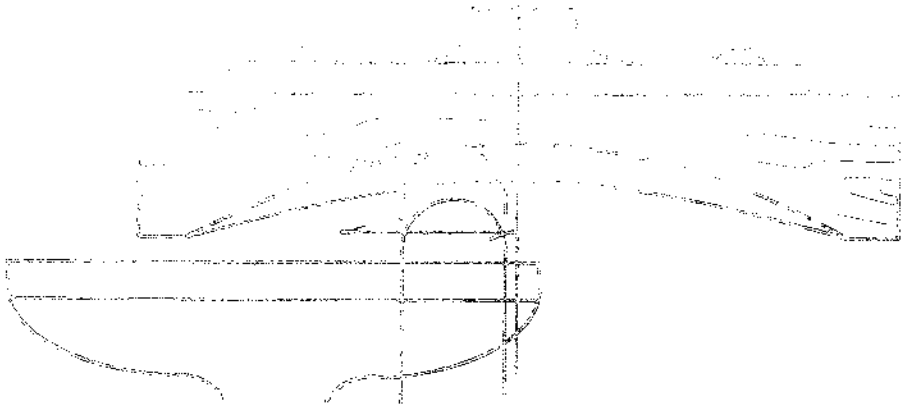


LESSON 10
ASSIGNMENT 63

11. Scribe a circle around center of stock having a diameter 5-1/2".

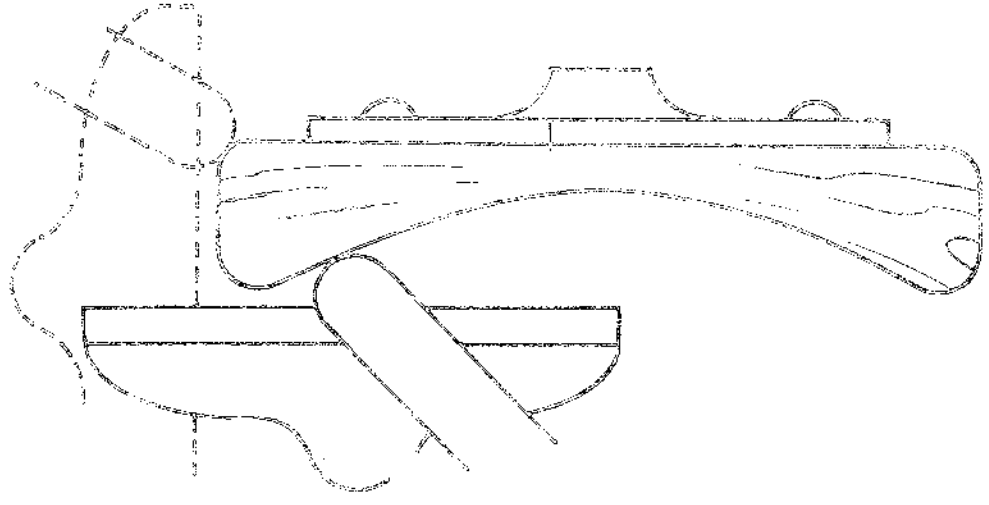


12. Using the round nose, shape the inside of bow. Make successive cuts from the circumference of the 5-1/2" circle to the center.

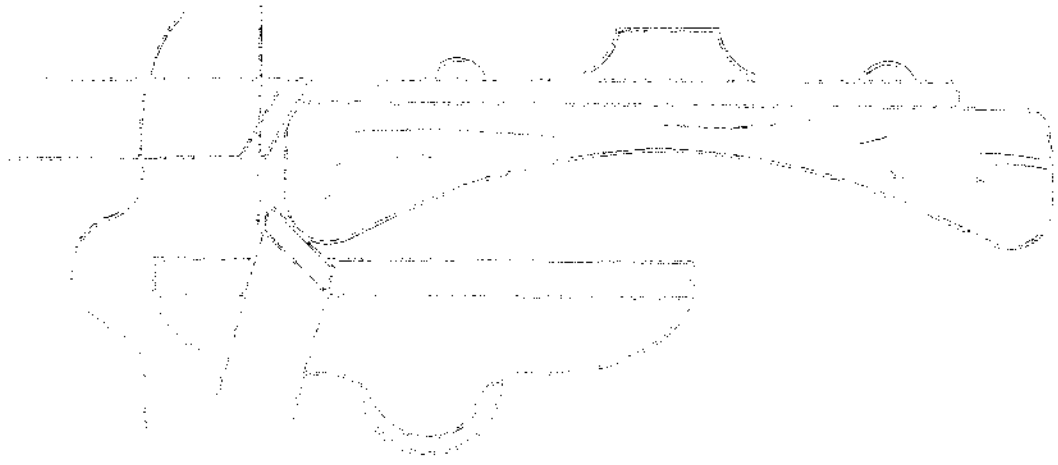


Note: Keep cutting edges sharp using rubber bonded wheel (if available) or hand stone. Make frequent checks of shape using pattern. Cutting deeper than 5/8" will result in damage due to contacting 5/8" wood screws. Final cuts should be very light to avoid scuffing the stock.

13. Round off all corners.

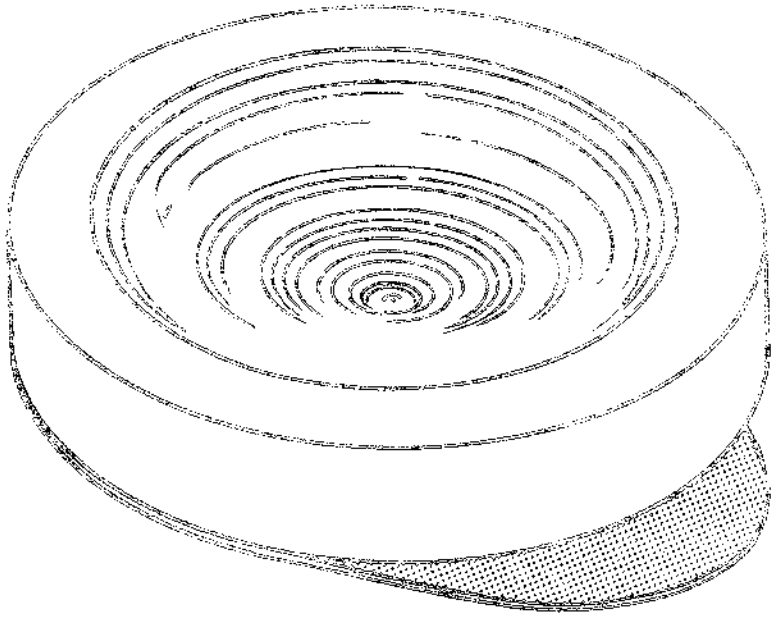


Note. Use the skew to cut convex curves at the inner and outer edges of the top of the bowl. Make initial cuts at bottom outside corner with round nose. Make finishing cuts with the skew.



14. [illegible]

15. Screw holes in bottom can be filled with plastic wood or the base of bowl can be covered with felt.

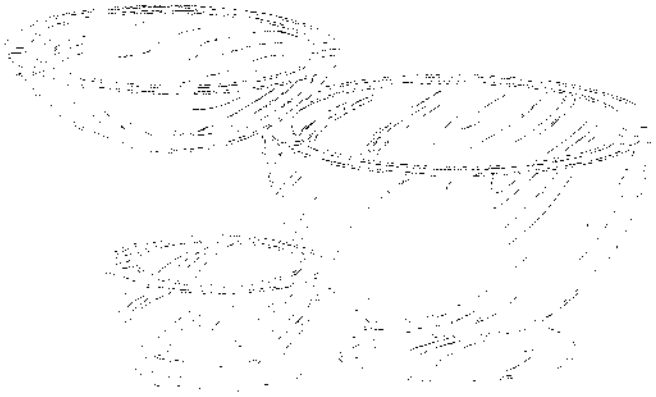


LESSON 13
ASSIGNMENT 64

[illegible]

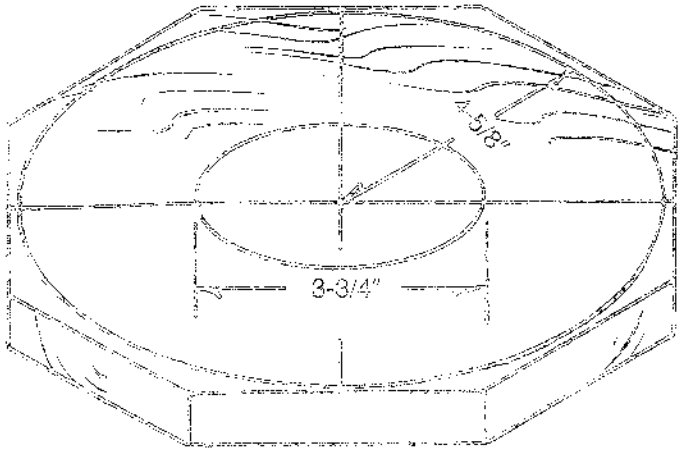
DESCRIPTION:
Stock for a deep bowl can be mounted on the faceplate by gluing a mounting block, cut from scrap, is attached to the faceplate with a screw. A disc of paper, followed by the stock to be turned is glued to the mounting block. When the turning is complete, separation at the paper is readily effected.

USE:
Faceplate turning with stock secured to a mounting block with glue is used to permit a thinner bottom than possible if mounted screw-up on stock [illegible] faceplate.



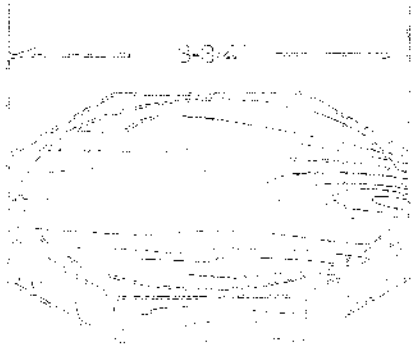
OPERATIONS:
Let us turn a deep bowl using mounting block.

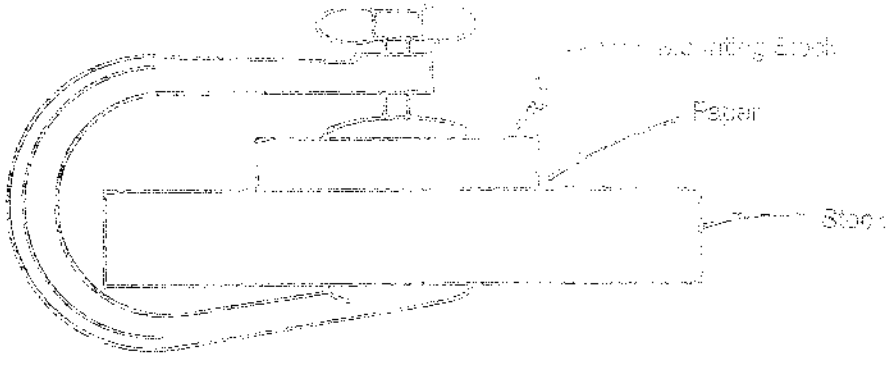
1. Prepare a piece of stock 1-3/4" × 3-1/4" × 3-1/4", (see "Note" under Operation 1, Assignment 63).
2. Scribe a 3-1/4" diameter circle on one side and cut stock to octagonal shape as prescribed for shallow bowl. Scribe a 3-3/4" circle about the center.



ASSIGNMENT 64

1. Draw a hexagonal mounting block (circle length 3" - 5.2" diameter circle) from 2.4" stock.

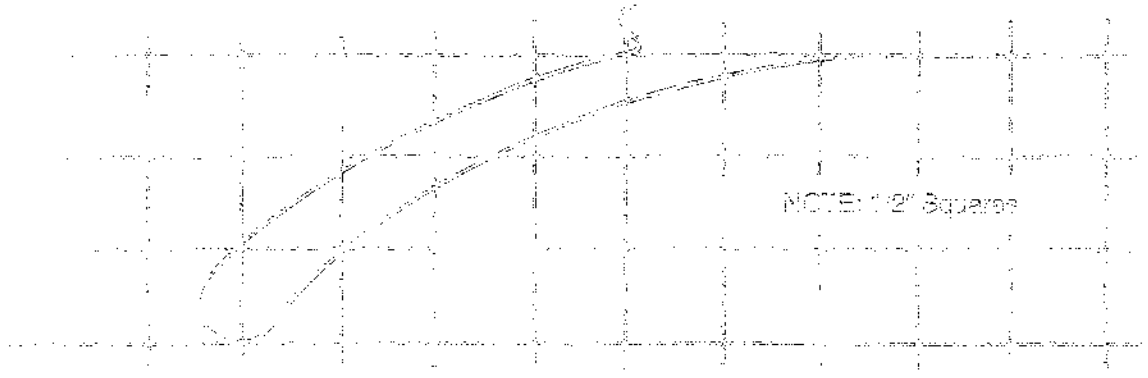




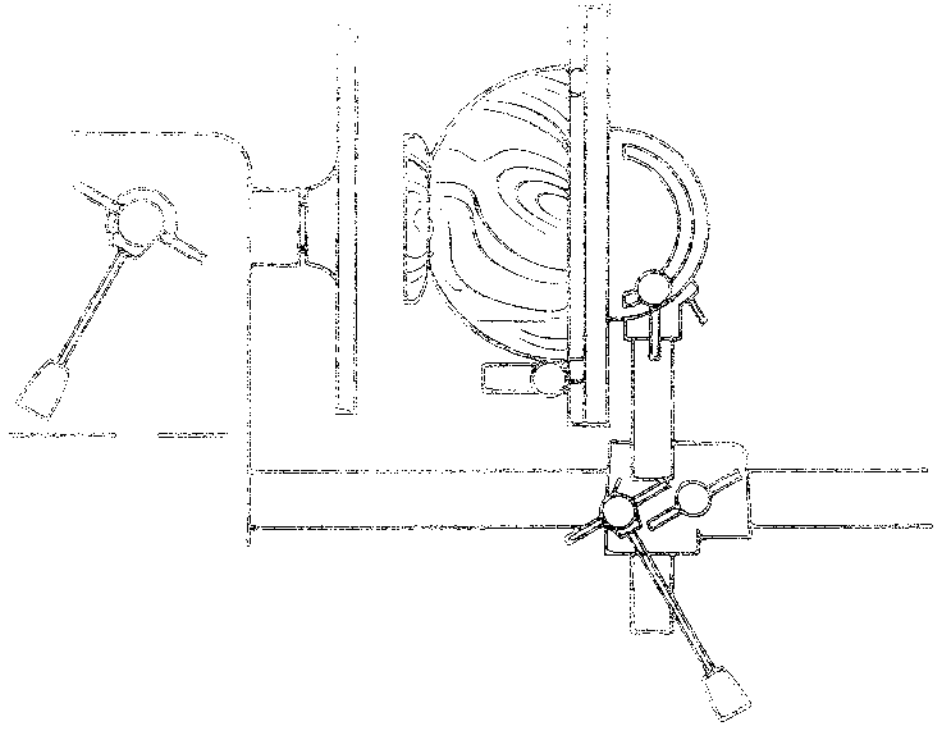
LESSON 10
ASSIGNMENT 64

Note: When clamped, check that all circumferences are matched.

6. Turn deep bowl to desired pattern using procedure outlined for turning shallow bowl. Use this design if you wish.

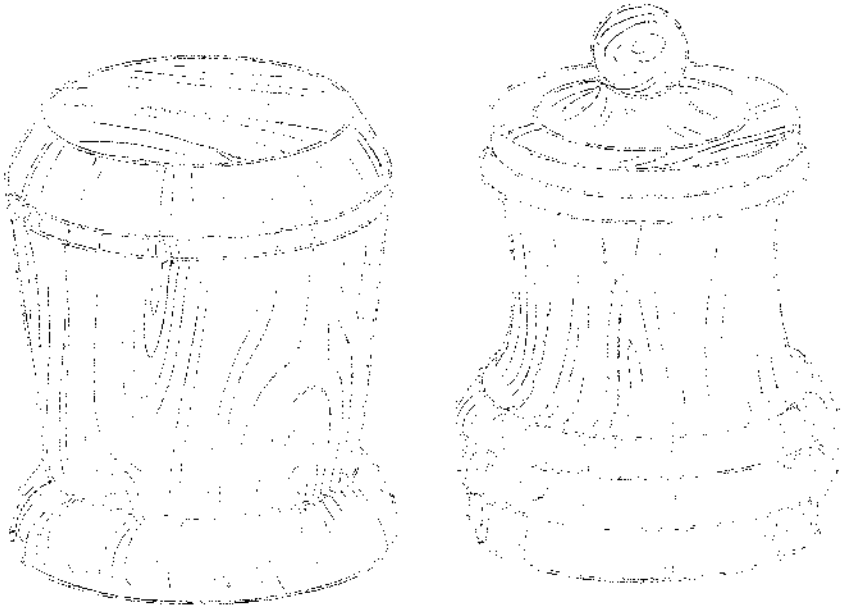


7. Remove from chuck, sand inside, and finish. Finish by buffing with a putty knife.
8. Remove waterproof tape and paper from bowl. Finish by rubbing with warm water or by sanding.



HOW TO MAKE BOWL AND COVER

DESCRIPTION:
Stock for the cover of a completed box or bowl can be turned by using the box or bowl as a chuck. A flange, turned on the cover stock to size which makes a tight fit in the base, positions the stock for turning. When the cover is completed, the tight fit can be relieved by sanding.



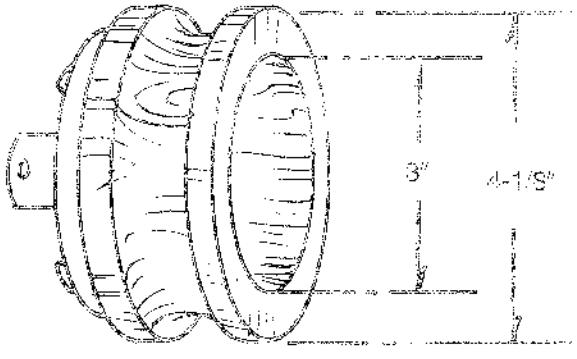
USE:
Many types of jewel, candy, and powder boxes require covers. Many bowls, including those of large size, are more useful and decorative if made with a well fitting cover.

OPERATIONS:
Let us turn a jewel box with a cover.

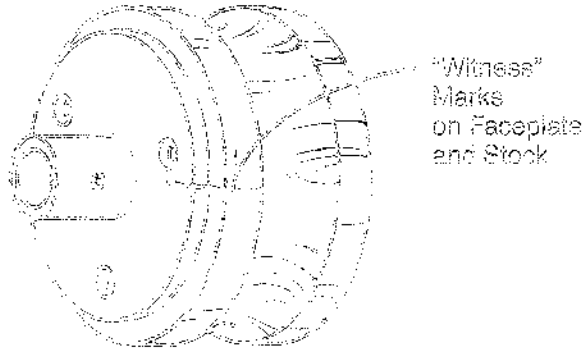
1. Prepare a piece of hardwood 2" × 4-1/2" × 4-1/2". Prepare second piece of hardwood 1-1/2" × 4-1/2" × 4-1/2".

Note: Medium hardwood, such as mahogany, is recommended.

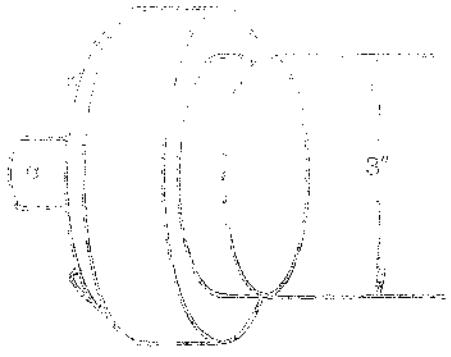
2. Attach 2" stock to 3-3/4" faceplate. Turn the base as shown.



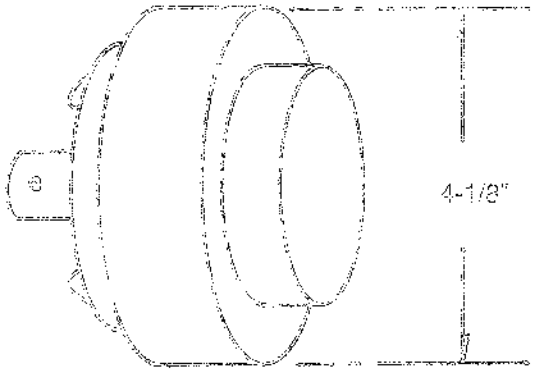
3. Before removing the finished box from the faceplate, mark both the outside bottom edge of work and the faceplate so that box can be remounted in the original position.



4. Rough out and [illegible] 1" stock on the faceplate. If cover is to be deeper than usual mounting stock, if not, use short screws and replace with subsequent screws made by outside turning.
5. Turn a flange which has an outside diameter equal to the inside diameter of the box.



6. Turn the outside diameter of the cover to equal the outside diameter of the base.



[illegible]

[illegible] If necessary, inside diameter of base can be enlarged by sanding. If the [illegible] is too loose, wrap a paper shim around flange.

Outer Fillet in Base

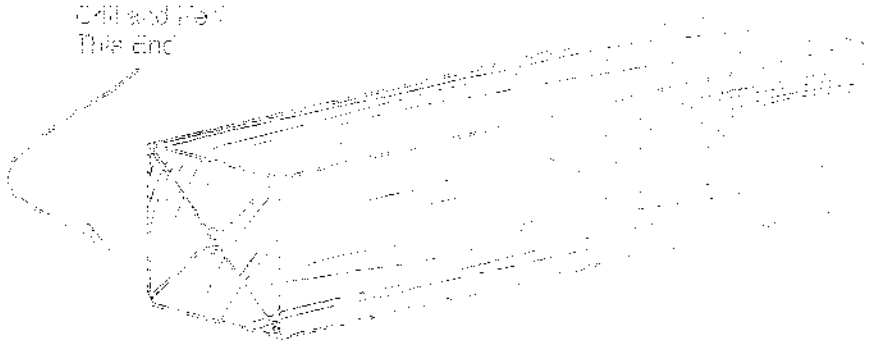
[illegible]

LESSON 10
ASSIGNMENT 6

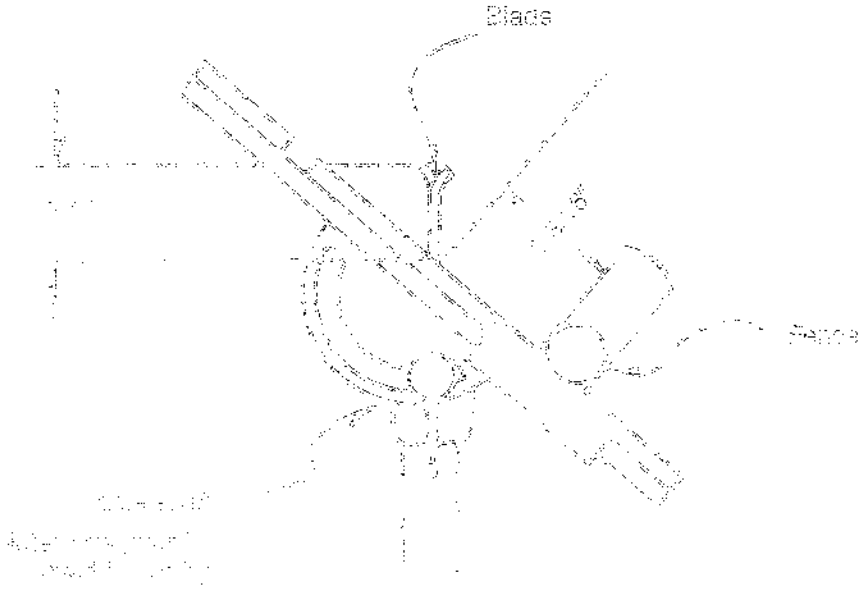
DESCRIPTION:
Hardwood stock, 10" long, to turn a [illegible] cylinder and a matching wedge is [illegible] drum and the edges [illegible] paper in place. [illegible] jump in mounted [illegible]

[illegible]
Between centers, and above [illegible] direction of rotation of the drum [illegible]
The 6" drum is used to sand [illegible] outside and inside edges of circles and cylinders.

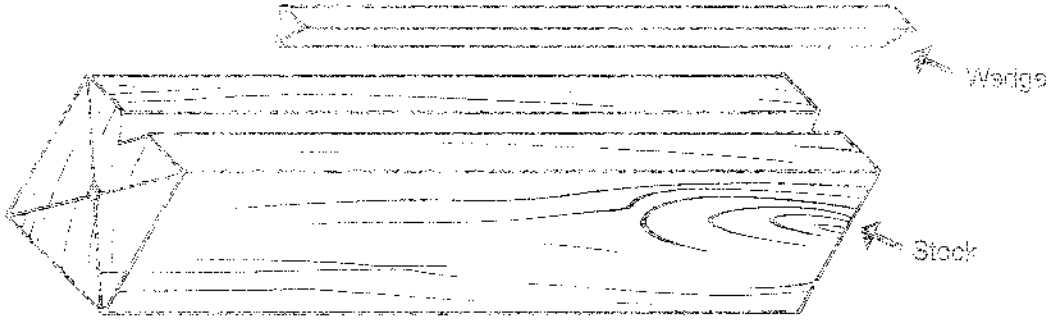
OPERATIONS:
1. Prepare a piece of hardwood 2" [illegible]
2. Scribe diagonals on both ends and drill 1/4" diameter holes to a depth [illegible] grooves with hack saw 1/8" deep on the diagonal [illegible]



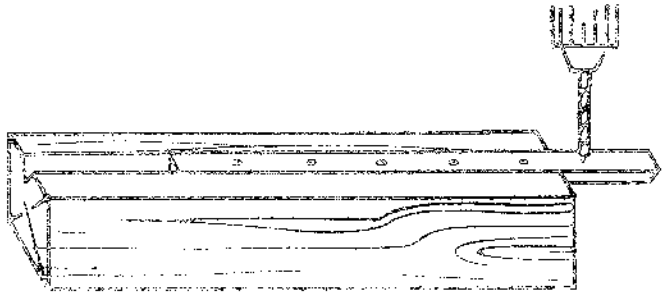
5. Set blank V in saw position. (Mount hollow ground blade, if available.)
6. Tilt table 45°. Adjust saw blade height to 7/8". Lock fence 1-3/16" to right of inside saw blade tooth.



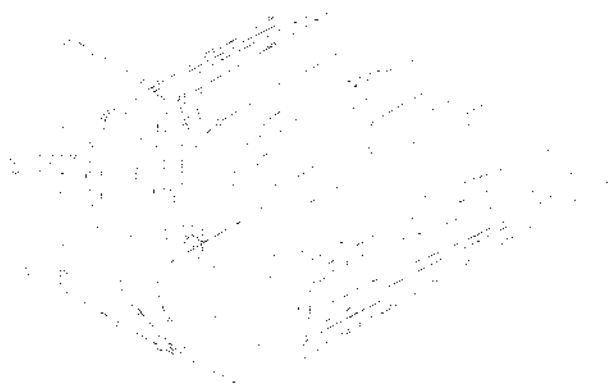
7. [illegible] Set fence to guide stock [illegible] saw blade as shown. Lock fence.



8. Set stock on work bench, wedge cut up. Put wedge in groove. Center punch marks on outside surface of wedge, measuring from one end, as follows: 3/4", 2-1/4", 6", 10-1/2", 15". Using V-cut as support, drill 3/16" clearance holes at punch marks.



ASSEMBLY

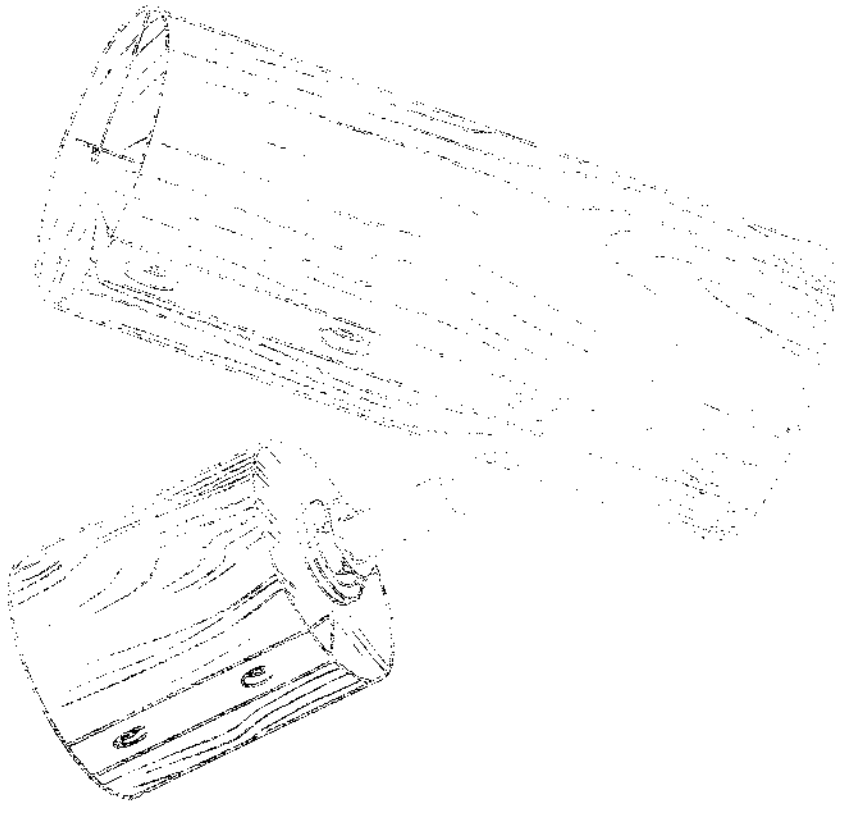


LESSON 10
ASSIGNMENT 66

14. Cut off 3" length of wedge. (Cut off section with two clearance holes.)
15. Cut abrasive paper to length equal to circumference plus twice depth of V-cut. Clamp paper by screwing on wedges.

Note: The length of a standard sheet of abrasive paper should exactly fit both drums.

The completed drums should appear as follows:



LESSON 2

TEST

[illegible]

[illegible]

TRUE OR FALSE. Circle your selection.

T F 1. In cutting tapers on wide pieces [illegible] Lesson 2

T F 2. [illegible]

T F 3. The tapering jig [illegible]

T F 4. The tapering jig [illegible]

T F 5. In cutting a chamfer the cut is started [illegible]

T F 6. The stock is turned [illegible]

T F 7. [illegible]

T F 8. The [illegible]

T F 9. [illegible]

T F 10. [illegible]

T F 11. When cutting [illegible] miter gauge is used.

T F 12. [illegible]

T F 13. [illegible]

T F 14. The [illegible] bevels and chamfers.

T F 15. The compound setting of each table and miter gauge [illegible] the textbook. See textbook, page 69

T F 16. Oil is applied to the bottom and side of the [illegible]

T F 17. When cutting compound miters the miter gauge must always be set [illegible] Textbook, page 67

T F 18. In cutting long tapers with the tapering jig [illegible] Lesson 2

T F 19. Standard 1" stock measures exactly [illegible]

MULTIPLE CHOICE. Circle your choice.

20. In cutting tapers on wide boards [illegible] Lesson 2

21. In cutting tapers with a tapering jig the operator stands [illegible] Textbook, page 62

22. The angle in the tapering jig remains the same [illegible] Lesson 2

23. Undercove the stretch of a bevel. Lesson 1

24. The angular cut on the edge of a board or plywood [illegible]

25. In cutting compound angles the table angle is [illegible] page 69

26. In cutting compound angles [illegible] Textbook, page 69

27. In making the second cut in sawing a [illegible] (kept in same position). Lesson 2

LESSON 3

TEST

NAME _____ DATE _____

CORRECTION SHEET

TRUE/FALSE: Circle your selection.

T F 1. Vertical boards are used for the double purpose of holding the work against the rip fence. Lesson 3

T F 2. The guard of a saw must be removed when making a dado. Lesson 3

T F 3. Rip members of a half-lap joint must be the same width. Lesson 3

T F 4. When remarking the outside dimensions of the rail for the joint, the same method can be used as for rip members. Lesson 3

T F 5. In making the half-lap joint, the width of the groove is equal to the thickness of the stock. Lesson 3

T F 6. The saw blade height setting for making the cheek cuts of the tenon is 1/8" higher than the thickness of the tenon. Lesson 3

T F 7. The [illegible] Lesson 3

T F 8. The [illegible] Lesson 3

T F 9. [illegible] Lesson 3

T F 10. The [illegible] Lesson 3

T F 11. The [illegible] Textbook, page 85

T F 12. The [illegible] Lesson 3

T F 13. [illegible] Lesson 3

T F 14. [illegible] excess stock is usually removed by making a crosscut. Lesson 3

T F 15. Tenons are made to fit snugly into mortises. Textbook, page 86

T F 16. If the rail is 3/4" thick the tenon should be 1-1/8" long. Lesson 3

T F 17. The stock is held against the face of the miter gauge and the rip fence when making cheek cuts. Lesson 3

T F 18. The vertical cuts for forming the cheeks on the tenon are made before the crosscuts. Lesson 3

T F 19. The purpose of the haunch on a haunched mortise and tenon joint is to increase the strength of the joint. Lesson 3

T F 20. It is good practice to make the thickness of the tenon equal to 1/3 the thickness of the stock. Lesson 3

MULTIPLE CHOICE: Underscore your choices.

1. Splines should fit in the grooves (fairly loose) (very tight) (just snug). Lesson 3
2. Half-lap-miter joints are used because (they are stronger) (better outward appearance) (easier to make). Lesson 3
3. In making the spline joint in Assignment 16 a (blind) (corner) (thru exposed) spline is used. Lesson 3
4. There (is only one) (are two) ways of sawing off the surplus material on stock for a half joint. Lesson 3
5. The thickness of a tenon is determined by (the width of the rail) (the thickness of the rail) (the length of the rail). Lesson 3
6. In cutting the shoulders on a tenon the waste stock is (between the saw and ripping fence) (drops off on table to left of saw). Lesson 3
7. In making the vertical cuts on a tenon, you should stand (to left) (to right) (directly behind) the line of saw blade cut. Textbook, page 85
8. In cutting the cheek cut on the haunched mortise and tenon joint, the rail is held (9-1/8") (9-1/16") (1/2") from the ripping fence. Lesson 3
9. Mortise and tenon joints are used most in (furniture) (picture frames). Lesson 3
10. The tenon made in Assignment 16 is for a (blind) (thru-right) (thru-left) mortise and tenon joint. Lesson 3

LESSON 6
TEST

NAME _____ DATE _____

DIRECTIONS:

TRUE OR FALSE: Circle your selection.

T (F) 1. Mortise chisels have tapered sides so they can be tightened into the handle. Sides should be parallel.

T (F) 2. When boring a blind mortise, holes should be drilled one after the other starting at one end.

T F 3. The approximate distance the guide on a drill press bit is extended is 4 times. Lesson 5

T (F) 4. All corners of a round floating dovetail mortise joint are squared at the same time. Lesson 3

T F 5. The [illegible] (Lesson 6, page 6)

T (F) 6. Rotate the chisel in a counterclockwise direction to each place separately. (Lesson 6, page 11)

T F 7. [illegible] Lesson 5

T F 8. Holes in soft metal can be drilled at a drill [illegible] Lesson 5

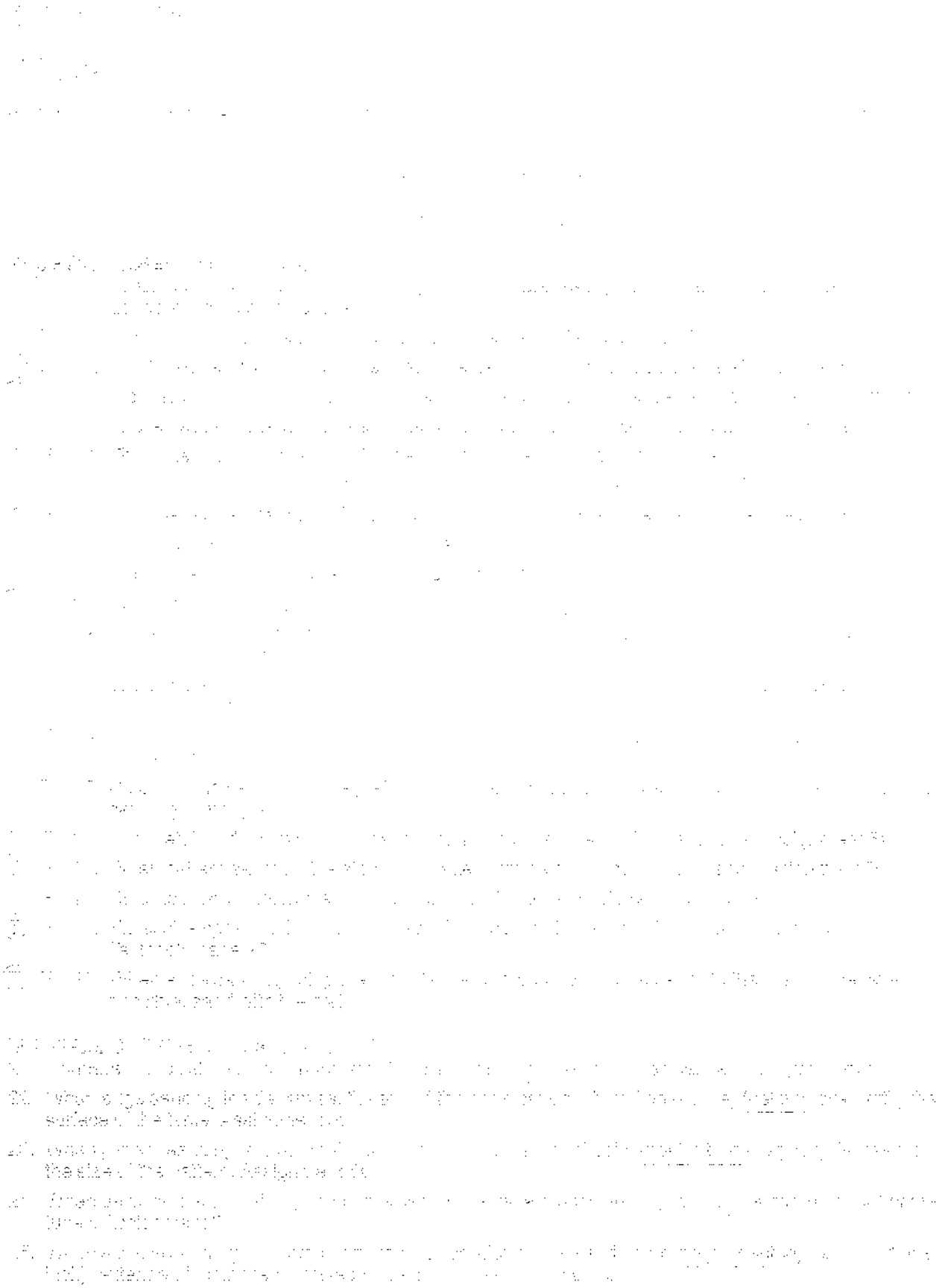
T F 9. [illegible]

T F 10. [illegible] Lesson 5

T F 11. [illegible]

LESSON 7

TEST



LESSON 9
TEST

TEST QUESTIONS ON LESSON 9

CORRECTION SHEET

TRUE-FALSE: [illegible]

T F 1. The cup center rotates with the stock. Lesson 9

T F 2. Lubricating the dead center reduces excessive [illegible] when rotated. Lesson 9

T F 3. The drive center is [illegible] the stock with a wooden mallet. Lesson 9

T F 4. [illegible]

T F 5. [illegible] Lesson 9

T F 6. Rough turning of square stock should be commenced using slow speed. Assignment 58

T F 7. [illegible] Assignment 59

T F 8. [illegible] should be checked by placing hand on [illegible]

T F 9. [illegible] Lesson 9

T F 10. [illegible]

T F 11. Outside [illegible] Textbook, page [illegible]

T F 12. [illegible]

T F 13. [illegible]

T F 14. [illegible]

T [✓ F] 15. Concave cuts are usually made with a skew. Assignment 59

[✓ T] F 16. The center of a concave cut in cylindrical stock is nearer the longitudinal axis of the stock than the ends. Assignment 59

[✓ T] F 17. A bead is formed by making two convex cuts. Textbook, page 190

T [✓ F] 18. Rounding corners with a skew requires special handling of the chisel not used for any other cut. Lesson 9

[✓ T] F 19. When preparing to round the corners of square stock, the skew should be placed on the tool rest with the heel of the cutting edge down. Assignment 61

[✓ T] F 20. The amount of taper cut in stock can be regulated with the eccentric in the tail stock.

MULTIPLE CHOICE: Underscore your choice.

1. Stock is tightened between centers by (pushing hard on the head stock) [✓ (extending the quill)] (driving stock into dead center). Textbook, page 185
2. The dead center is held in place by [✓ (set screw)] (lock nut) (friction). Textbook, page 184
3. Normally, the top edge of the tool rest should be [✓ (even with)] (well above) (well below) the axis of the stock. Textbook, page 185
4. To determine the diameter of a cylinder use [✓ (outside calipers)] (steel square) (inside calipers). Textbook, page 195
5. The parting tool is usually used to (cut) [✓ (scrape)] (shear). Textbook, page 190

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