Grizzly Industrial, Inc.®

MODEL T21320
12" COMBINATION 3-IN-1 SHEET METAL MACHINE

OWNER'S MANUAL

(FOR MACHINES MANUFACTURED FROM 2/09 AND LATER)

#TS11607 PRINTED IN CHINA

⚠ WARNING!

This manual provides critical safety instructions on the proper setup, operation, maintenance, and service of this machine/tool. Save this document, refer to it often, and use it to instruct other operators.

Failure to read, understand and follow the instructions in this manual may result in fire or serious personal injury—including amputation, electrocution, or death.

The owner of this machine/tool is solely responsible for its safe use. This responsibility includes but is not limited to proper installation in a safe environment, personnel training and usage authorization, proper inspection and maintenance, manual availability and comprehension, application of safety devices, cutting/sanding/grinding tool integrity, and the usage of personal protective equipment.

The manufacturer will not be held liable for injury or property damage from negligence, improper training, machine modifications or misuse.

⚠ WARNING!

Some dust created by power sanding, sawing, grinding, drilling, and other construction activities contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:

- **Lead from lead-based paints.**
- **Crystalline silica from bricks, cement and other masonry products.**
- **Arsenic and chromium from chemically-treated lumber.**

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: Work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.

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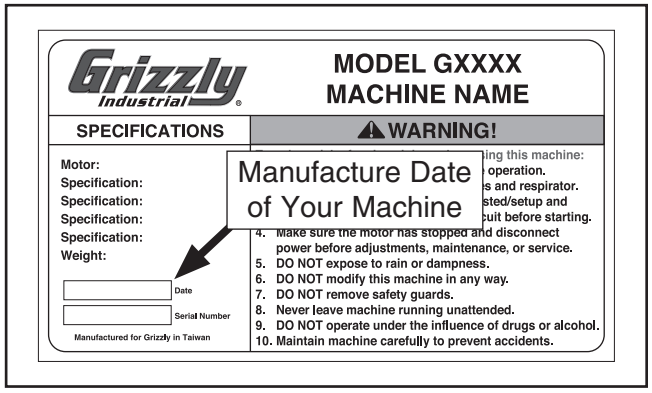
INTRODUCTION

Manual Accuracy

We are proud to offer this manual with your new machine! We've made every effort to be exact with the instructions, specifications, drawings, and photographs of the machine we used when writing this manual. However, sometimes errors do happen and we apologize for them.

Also, owing to our policy of continuous improvement, **your machine may not exactly match the manual**. If you find this to be the case, and the difference between the manual and machine leaves you in doubt, check our website for the latest manual update or call technical support for help.

Before calling, find the manufacture date of your machine by looking at the date stamped into the machine ID label (see below). This will help us determine if the manual version you received matches the manufacture date of your machine.



For your convenience, we post all available manuals and manual updates for free on our website at **www.grizzly.com**. Any updates to your model of machine will be reflected in these documents as soon as they are complete.

Contact Info

We stand behind our machines. If you have any service questions, parts requests or general questions about the machine, please call or write us at the location listed below.

Grizzly Industrial, Inc.
1203 Lycoming Mall Circle
Muncy, PA 17756
Phone: (570) 546-9663
Fax: (800) 438-5901
E-Mail: techsupport@grizzly.com

If you have any comments regarding this manual, please write to us at the address below:

Grizzly Industrial, Inc.
c/o Technical Documentation Manager
P.O. Box 2069
Bellingham, WA 98227-2069
Email: manuals@grizzly.com

Machine Description

The Model T21320 is a sheet metal machine designed to bend and cut sheet metal up to 22 gauge in thickness and 12" in width.

The slip rollers are used to flatten or form cylinders, cones, and arcs in sheet metal. The brake portion of the machine is designed to create bends up to 90° and to fold sheet metal into boxes, pans, or trays. With the use of the hand crank, the upper shear blade moves down past the fixed table blade, from left to right, to shear the workpiece that is supported on the table.

Identification

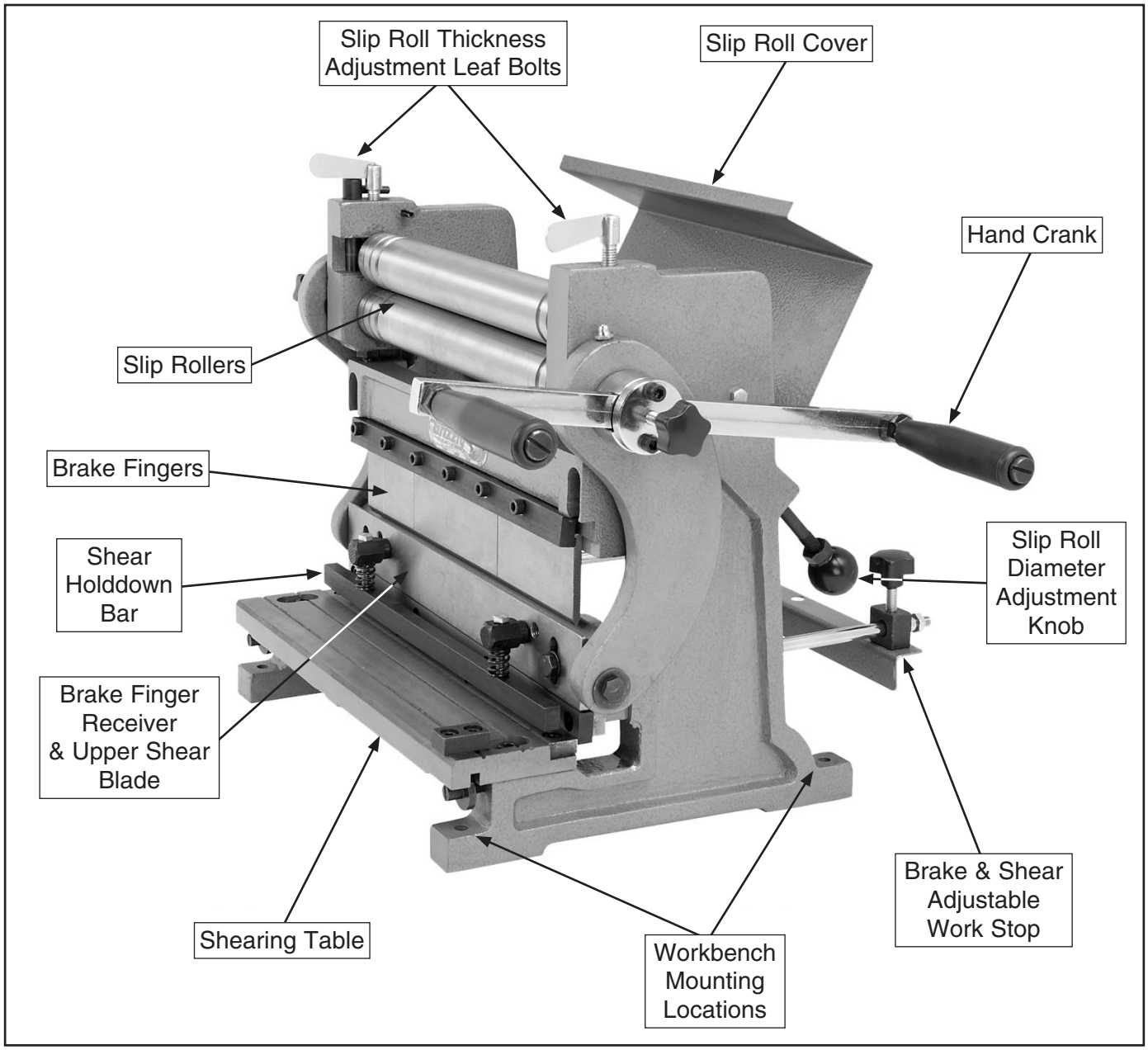


Figure 1. Model T21320 identification.

NOTICE

If you have never used this type of machine or equipment before, WE STRONGLY RECOMMEND that you read books, review industry trade magazines, or get formal training before beginning any projects. Regardless of the content in this section, Grizzly Industrial will not be held liable for accidents caused by lack of training.

MACHINE DATA SHEET

Customer Service #: (570) 546-9663 • To Order Call: (800) 523-4777 • Fax #: (800) 438-5901

MODEL T21320 12" COMBINATION 3-IN-1 SHEET METAL MACHINE

Product Dimensions:

Weight	95 Lbs.
Width/Depth/Height	24" x 23" x 15⅜"
Footprint (Width/Depth)	14⅛" x 11½"

Shipping Dimensions:

Type	Crate
Content	Machine
Weight	100 Lbs.
Length/Width/Height	23" x 13" x 17"

Capacities:

Maximum Workpiece Width	12"
Maximum Workpiece Thickness	22 Ga.
Pan/Box Brake Minimum Reverse Bend	¾"
Pan/Box Brake Maximum Side Height @ 90°	2"
Slip Roll Minimum Cylinder Diameter	1½"
Slip Roll Wire Sizes	⅛", 11⁄64", 13⁄64"
Pan/Box Maximum Side Height	2"

Construction

Brake	Steel w/ Hardened Edge
Frame	Cast Iron
Base	Cast Iron
Shear Table	Precision Ground Cast Iron
Shear Blades	Reversible Precision Ground Hardened Steel
Shear Hold-Down Clamp	Cast-Iron

Other Specifications:

Country Of Origin	China
Warranty	1 Year
Serial Number Location	ID Label on Top of Machine
Assembly Time	30 Minutes

Features:

Shear Table Front Guide
Shear & Brake Adjustable Rear Stop
Hardened Steel Brake Fingers
Precision Ground Hardened Steel Shear Blade

SECTION 1: SAFETY

⚠WARNING

For Your Own Safety, Read Instruction Manual Before Operating this Machine

The purpose of safety symbols is to attract your attention to possible hazardous conditions. This manual uses a series of symbols and signal words intended to convey the level of importance of the safety messages. The progression of symbols is described below. Remember that safety messages by themselves do not eliminate danger and are not a substitute for proper accident prevention measures.

⚠DANGER **Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.**

⚠WARNING **Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.**

⚠CAUTION **Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury. It may also be used to alert against unsafe practices.**

NOTICE **This symbol is used to alert the user to useful information about proper operation of the machine.**

⚠WARNING

Safety Instructions for Machinery

OWNER'S MANUAL. Read and understand this owner's manual BEFORE using machine. Untrained users can be seriously hurt.

EYE PROTECTION. Always wear ANSI-approved safety glasses or a face shield when operating or observing machinery. to reduce the risk of eye injury or blindness from flying particles Everyday eyeglasses are not approved safety glasses.

HAZARDOUS DUST. Dust created while using machinery may cause cancer, birth defects, or long-term respiratory damage. Be aware of dust hazards associated with each workpiece material, and always wear a NIOSH-approved respirator to reduce your risk.

WEARING PROPER APPAREL. Do not wear clothing, apparel, or jewelry that can become entangled in moving parts. Always tie back or cover long hair. Wear non-slip footwear to avoid accidental slips which could cause a loss of workpiece control.

HEARING PROTECTION. Always wear hearing protection when operating or observiing loud machinery. Extended exposure to this noise without hearing protection can cause permanent hearing loss.

MENTAL ALERTNESS. Be mentally alert when running machinery. Never operate under the influence of drugs or alcohol, when tired, or when distracted.

⚠WARNING
Safety Instructions for Machinery

DISCONNECTING POWER SUPPLY. Always disconnect machine from power supply before servicing, adjusting, or changing cutting tools (bits, blades, cutters, etc.). Make sure switch is in OFF position before reconnecting to avoid an unexpected or unintentional start.

INTENDED USE. Only use the machine for its intended purpose and only use recommended accessories. Never stand on machine, modify it for an alternative use, or outfit it with non-approved accessories.

STABLE MACHINE. Unexpected movement during operations greatly increases the risk of injury and loss of control. Verify machines are stable/secure and mobile bases (if used) are locked before starting.

FORCING MACHINERY. Do not force machine. It will do the job safer and better at the rate for which it was designed.

GUARDS & COVERS. Guards and covers can protect you from accidental contact with moving parts or flying debris. Make sure they are properly installed, undamaged, and working correctly before using machine.

REMOVING TOOLS. Never leave adjustment tools, chuck keys, wrenches, etc. in or on machine—especially near moving parts. Verify removal before starting!

AWKWARD POSITIONS. Keep proper footing and balance at all times when operating machine. Do not overreach! Avoid awkward hand positions that make workpiece control difficult or increase the risk of accidental injury.

DANGEROUS ENVIRONMENTS. Do not use machinery in wet locations, cluttered areas, around flammables, or in poorly-lit areas. Keep work area clean, dry, and well lighted to minimize risk of injury.

APPROVED OPERATION. Untrained operators can be seriously hurt by machinery. Only allow trained or properly supervised people to use machine. When machine is not being used, disconnect power, remove switch keys, or lock-out machine to prevent unauthorized use—especially around children. Make workshop kid proof!

CHILDREN & BYSTANDERS. Keep children and bystanders a safe distance away from work area. Stop using machine if children or bystanders become a distraction.

FEED DIRECTION. Unless otherwise noted, feed work against the rotation of blades or cutters. Feeding in the same direction of rotation may pull your hand into the cut.

SECURING WORKPIECE. When required, use clamps or vises to secure workpiece. A secured workpiece protects hands and frees both of them to operate the machine.

UNATTENDED OPERATION. Never leave machine running while unattended. Turn machine ***OFF*** and ensure all moving parts completely stop before walking away.

MAINTENANCE & INSPECTION. A machine that is not properly maintained may operate unpredictably. Follow all maintenance instructions and lubrication schedules to keep machine in good working condition. Regularly inspect machine for loose bolts, alignment of critical parts, binding, or any other conditions that may affect safe operation. Always repair or replace damaged or misadjusted parts before operating machine.

EXPERIENCING DIFFICULTIES. If at any time you are experiencing difficulties performing the intended operation, stop using the machine! Contact our Technical Support Department at (570) 546-9663.

⚠WARNING
Additional Safety Instructions for Combination 3-in-1 Sheet Metal Machines

1. **OVERLOADING.** Attempting to overload this machine beyond the capacities specified in the **Data Sheet** on **Page 4** could cause personal injury or property damage. DO NOT use any sort of "cheater" bar or pipe on the hand crank.

2. **USAGE.** To avoid personal injury or property damage, always use each tool of the machine for its intended purposes and DO NOT modify the machine in any way.

3. **METAL EDGES.** Sharp metal edges can quickly cut your fingers. ALWAYS chamfer and de-burr sharp sheet metal edges before bending and after cutting the workpiece.

4. **PINCHING.** This machine represents severe pinching and amputation hazards. ALWAYS keep hands away from the rollers, brake fingers, clamping bar, and shearing blades when operating.

5. **PERSONAL PROTECTION.** To avoid personal injury, ALWAYS wear heavy leather gloves, ANSI approved eye protection, and leather boots with extra toe protection when using this machine.

6. **BODY POSITION.** To avoid personal injury due to slipping or falling, ALWAYS maintain secure footing and a comfortable body position when using this machine.

7. **GOOD WORKING CONDITION.** To reduce the risk of personal injury, ALWAYS inspect the working parts of this machine for cracks, burrs, loose fasteners, or any other damage and resolve any issue before beginning operation.

8. **WORKBENCH MOUNTING.** Personal injury could occur if this machine should unexpectedly move during operation. ALWAYS make sure the machine is securely mounted to a stable workbench or stand that can support the weight and pressures of the operation.

9. **ENTANGLEMENT HAZARDS.** The moving parts of this machine represent entanglement hazards. DO NOT wear jewelry, or loose clothing, and tie back long hair when using this machine.

10. **SHEARING BLADES/BRAKE FINGERS.** If not properly aligned, the shearing blades or brake fingers can cause machine parts or the workpiece to break up and fly at the operator. ALWAYS keep these parts properly adjusted and in good working condition.

11. **OPERATIONAL QUESTIONS.** If, at any time, you are experiencing difficulties performing the intended operation, stop using the machine! Then contact our Tech Support at (570) 546-9663.

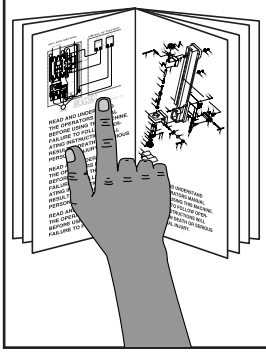
⚠WARNING

Like all machinery there is potential danger when operating this machine. Accidents are frequently caused by lack of familiarity or failure to pay attention. Use this machine with respect and caution to decrease the risk of operator injury. If normal safety precautions are overlooked or ignored, serious personal injury may occur.

⚠CAUTION

No list of safety guidelines can be complete. Every shop environment is different. Always consider safety first, as it applies to your individual working conditions. Use this and other machinery with caution and respect. Failure to do so could result in serious personal injury, damage to equipment, or poor work results.

SECTION 2: SETUP



⚠WARNING

This machine presents serious injury hazards to untrained users. Read through this entire manual to become familiar with the controls and operations before starting the machine!

⚠WARNING

Wear safety glasses during the entire setup process!

⚠WARNING

This machine and its components are heavy. Get lifting help and use safe lifting methods to lift and move heavy items.

Needed for Setup

Description	Qty
• Safety Glasses	1
• Cleaner/Degreaser (**Page 9**)	As Needed
• Disposable Shop Rags	As Needed
• Additional People	1
• Standard Screwdriver #2	1
• Wrench 14mm	1
• Mounting Hardware (**Page 10**)	As Needed

Unpacking

Your machine was carefully packaged for safe transportation. Remove the packaging materials from around your machine and inspect it. If you discover the machine is damaged, *please immediately call Customer Service at (570) 546-9663 for advice.*

Save the containers and all packing materials for possible inspection by the carrier or its agent. *Otherwise, filing a freight claim can be difficult.*

When you are completely satisfied with the condition of your shipment, inventory the contents.

⚠WARNING

SUFFOCATION HAZARD!

Immediately discard all plastic bags and packing materials to eliminate choking/suffocation hazards for children and animals.

Inventory

The following is a description of the main components shipped with your machine. Lay the components out to inventory them.

Note: *If you can't find an item on this list, check the mounting location on the machine or examine the packaging materials carefully. Occasionally we pre-install certain components for shipping purposes.*

Inventory: (Figure 2–3)	**Qty**
A. Sheet Metal Machine	1
B. Shear & Brake Rear Work Stop	1
C. Crank Handle	1
D. Crank Handle Lock Knobs	2
E. Hex Wrenches 5, 6mm	1 Each

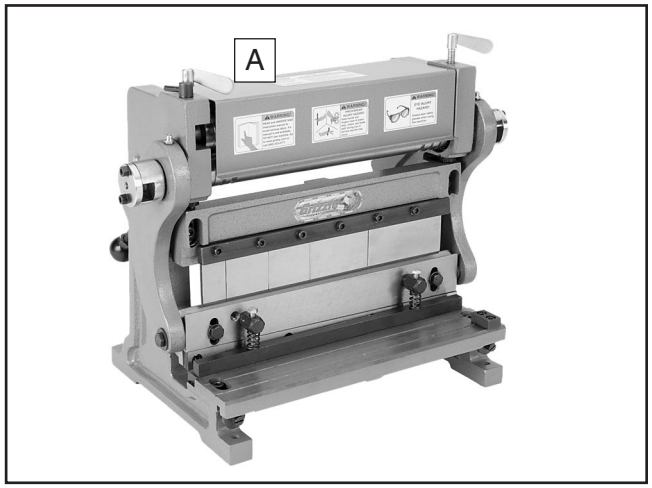


Figure 2. Model T21320 base machine.

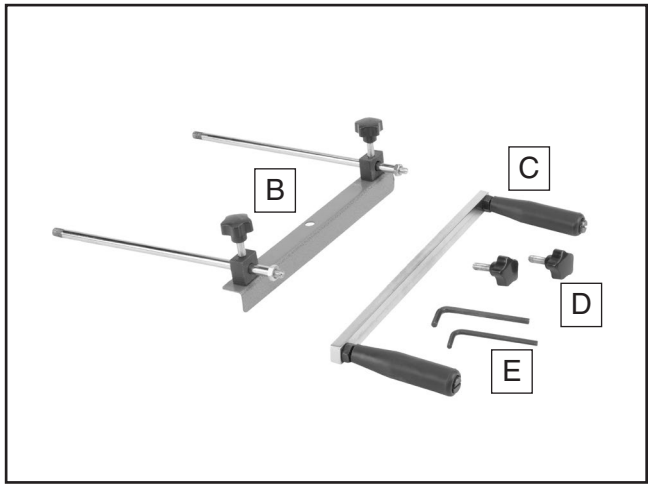


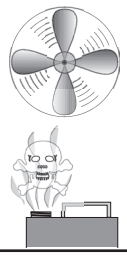
Figure 3. Model T21320 small item inventory.

Clean Up

The unpainted surfaces are coated with a waxy oil to prevent corrosion during shipment. Remove this protective coating with a solvent cleaner or degreaser, such as shown in **Figure 4**. For thorough cleaning, some parts must be removed. **For optimum performance, clean all moving parts or sliding contact surfaces.** Avoid chlorine-based solvents, such as acetone or brake parts cleaner that may damage painted surfaces. Always follow the manufacturer's instructions when using any type of cleaning product.

⚠WARNING

Gasoline and petroleum products have low flash points and can explode or cause fire if used to clean machinery. DO NOT use these products to clean the machinery.



⚠CAUTION

Many cleaning solvents are toxic if inhaled. Minimize your risk by only using these products in a well ventilated area.

G2544—Solvent Cleaner & Degreaser
H9692—Orange Power Degreaser
Great products for removing shipping grease.

Figure 4. Cleaner/degreasers available from Grizzly.

Site Considerations

Floor Load

Refer to the **Machine Data Sheet** for the weight and footprint specifications of your machine. Some workbenches or stands may require additional reinforcement to support the machine, workpiece, and the forces applied during operation.

Placement Location

Consider existing and anticipated needs, size of material to be processed through each machine, and space for auxiliary stands, work tables or other machinery when establishing a location for your new machine. See **Figure 5** for the minimum working clearances.

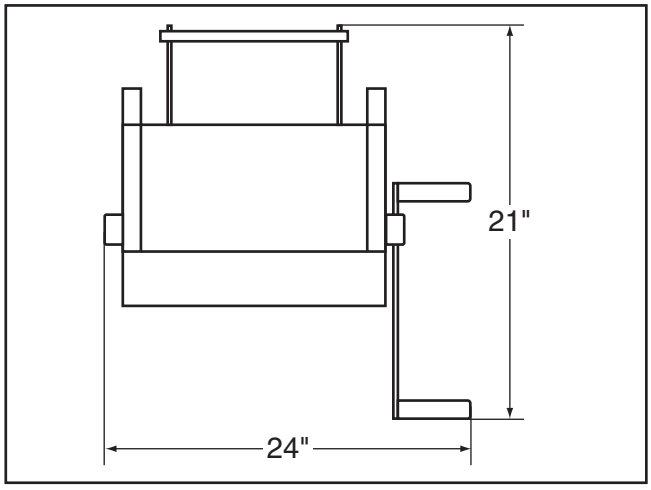
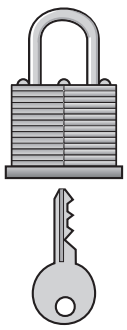


Figure 5. Minimum working clearances.



⚠CAUTION

Children and visitors may be seriously injured if unsupervised around this machine. Lock entrances to the shop or disable start switch or power connection to prevent unsupervised use.

Mounting

The base of this machine has holes that allow it to be mounted to a workbench. For a safe and smooth operation of this machine, it MUST be securely mounted to an appropriate workbench or stand.

The strongest mounting option is a "Through Mount" where holes are drilled all the way through the workbench, and hex bolts, washers, and hex nuts are used to secure the drill press to the workbench.

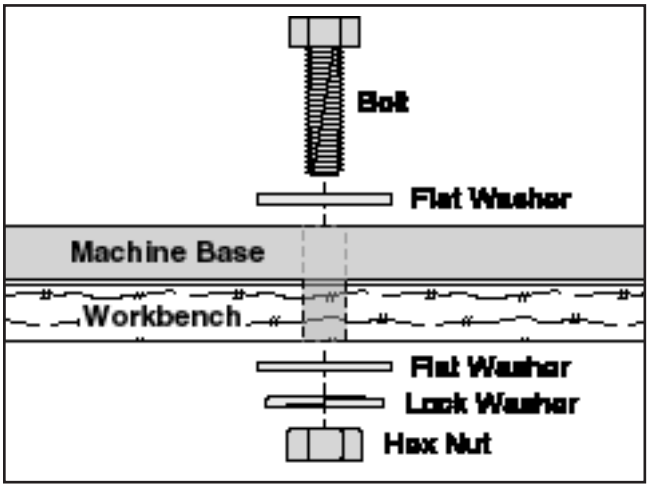


Figure 6. Example of a through mount setup.

Another option for mounting is a "Direct Mount" where the machine is simply secured to the workbench with a lag screw.

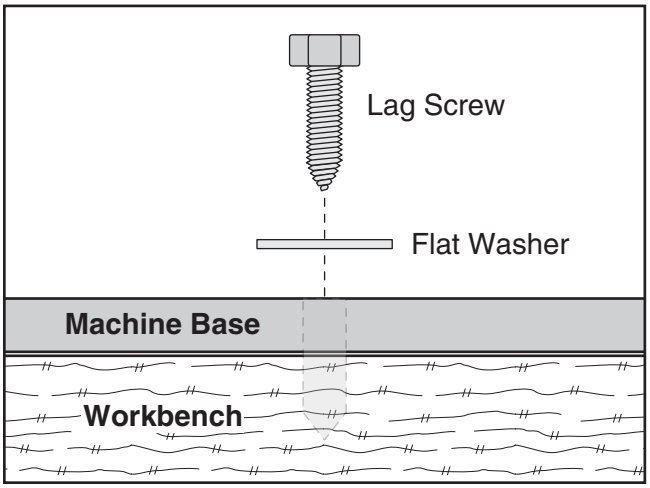


Figure 7. Example of a direct mount setup.

Assembly

In addition to the assembly procedures below, some disassembly is required to remove storage grease and relubricate the cleaned parts.

To assemble and clean your machine:

1. Remove one of the cap screws on the hand crank hub, rotate the end cap out of the way, then insert the hand crank in the slot (see **Figure 8**).

Note: *It is your preference which side of the machine you install the hand crank.*

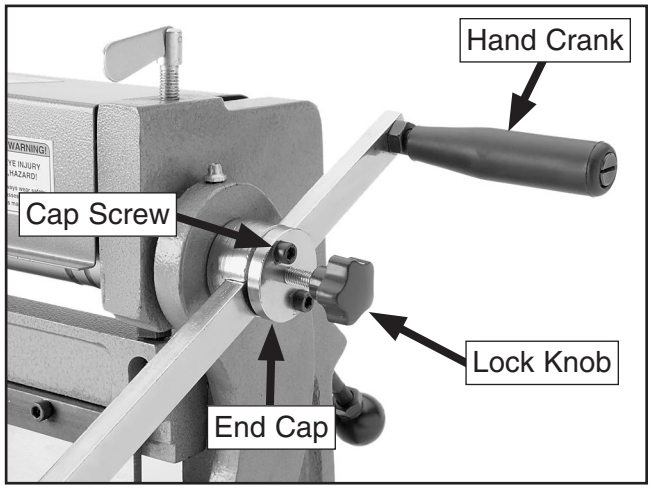


Figure 8. Hand crank installed.

2. Re-install the cap screw removed in **Step 1**, then thread and tighten a lock knob into the center hole of the end cap to secure the hand crank in place.

Tip: *When needed, extend one end of the hand crank from the hub for greater leverage.*

3. Thread the rods into either the upper or lower mounting holes, as shown in **Figure 9**. Only hand-tighten the rods—over-tightening will make it difficult to remove them.

Note: *Install the rods in the upper mounting holes to use the work stop with the brake or in the lower holes to use it with the shear.*

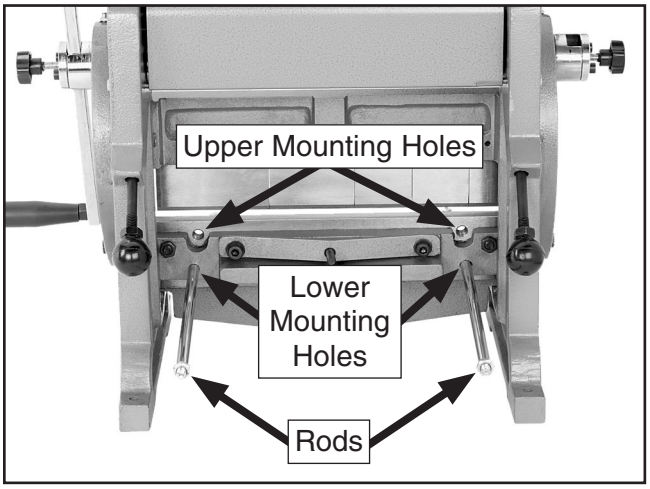


Figure 9. Work stop rods mounted in the lower holes for use with the shear.

4. Remove the hex nuts from the ends of the rods, slide the stop bar onto the rods and position it for your operation, then tighten the lock knobs to secure it, as shown in **Figure 10**.

Note: *Re-installing the hex nuts is optional.*

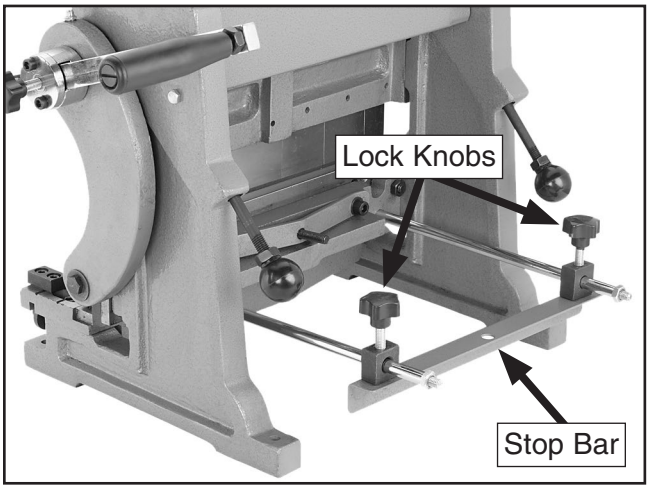


Figure 10. Work stop installed for use with the shear.

5. Loosen the two hex bolts securing the finger receiver/upper shear blade to the frame (see **Figure 11**).

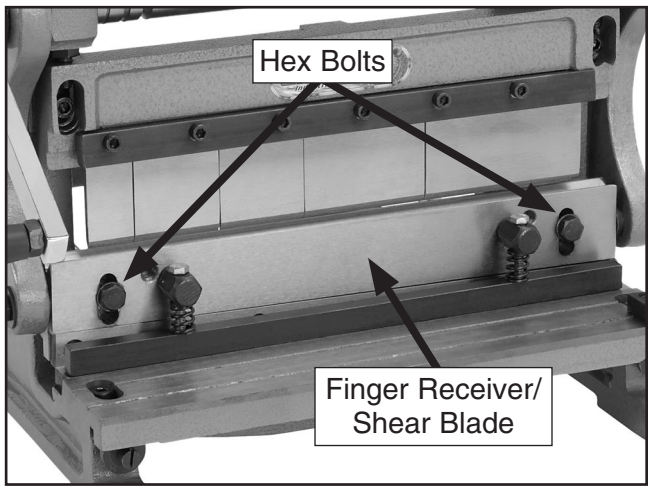


Figure 11. Loosening the hex bolts securing the finger receiver.

6. Move the table back until the upper shear blade can pass down behind the table blade by loosening the two cap screws securing the shear table to the frame and rotating the table adjustment screws counterclockwise (see **Figure 57**).

   Note: *Operational adjustment of the shearing blades is covered in the* ***Shearing Blade Gap Adjustment*** *procedure on* ***Page 32****.*

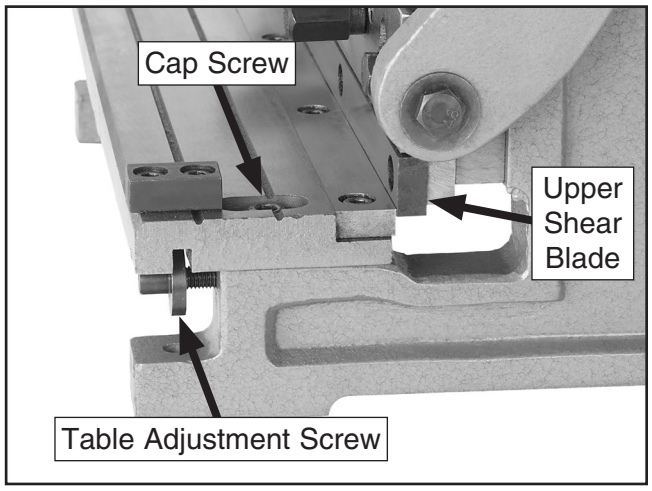


Figure 12. Table adjustment controls.

7. Make sure the finger receiver and upper shear blade move up and down smoothly, re-tighten the hex bolts just until they are snug, then back them off approximately ¼ turn.

8. Use the hand crank to position the brake finger receiver close to the brake fingers, as shown in **Figure 13**.

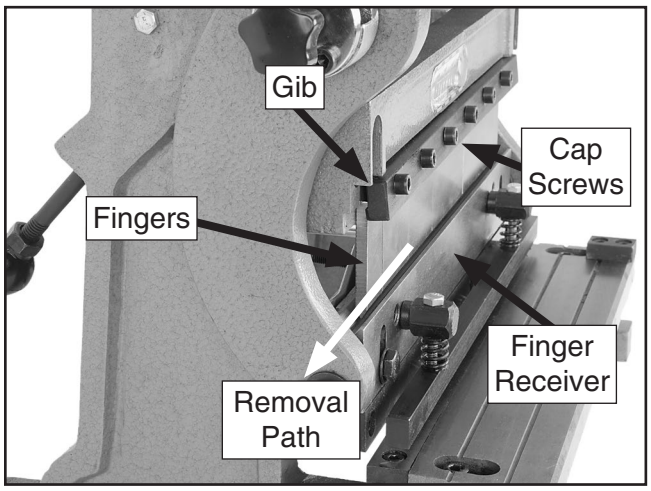


Figure 13. Brake finger components.

9. Loosen the gib cap screws to release the fingers, then remove the fingers from the side of the finger receiver, as shown in **Figure 13**.

10. Use shop rags and a degreaser (**Page 9**) to remove the storage grease from the fingers, gib, and receiver. Thoroughly dry the parts, then apply a thin coat of an anti-rust lubricant to all the parts (refer to **Accessories** on **Page 26** for options from Grizzly).

11. Place a thin piece of wood on the finger receiver, as shown in **Figure 14**, then re-install the fingers so that they rest on the wood piece. Make sure the tops of the fingers are between the gib and the casting.

Note: *Install the widest finger to the right, then repeat with each smaller finger.*

Figure 14. Piece of wood positioned to seat the fingers.

12. Make sure the fingers are slightly loose between the gib and the casting, then use the hand crank to raise the receiver to fully seat the fingers up against the casting behind the gib, as shown in **Figure 15**.

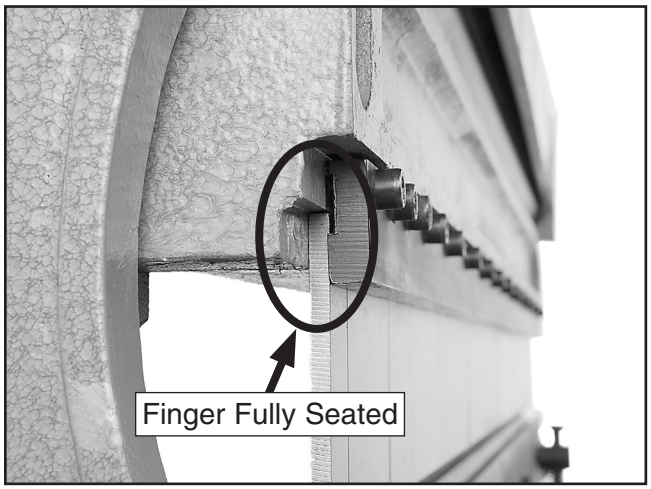
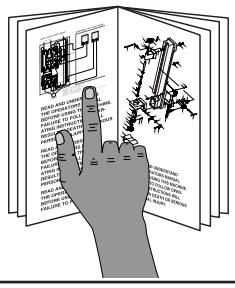


Figure 15. Fingers fully seated.

13. Re-tighten all of the gib cap screws.

SECTION 3: OPERATIONS

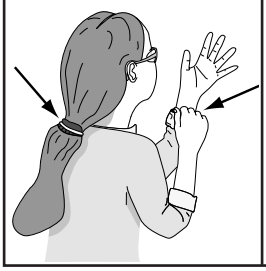


⚠WARNING

To reduce the risk of serious injury when using this machine, read and understand this entire manual before beginning any operations.

⚠WARNING

Damage to your eyes, hands and feet could result from using this machine without proper protective gear. Always wear safety glasses, leather gloves, and steel toe footwear when operating this machine.



⚠WARNING

Loose hair, clothing, or jewelry could get caught in machinery and cause serious personal injury. Keep these items away from moving parts at all times to reduce this risk.

NOTICE

If you have never used this type of machine or equipment before, WE STRONGLY RECOMMEND that you read books, review industry trade magazines, or get formal training before beginning any projects. Regardless of the content in this section, Grizzly Industrial will not be held liable for accidents caused by lack of training.

Slip Roll Overview

The slip roll is used to flatten or form cylinders, cones, and arcs in mild sheet metal up to 22 gauge in thickness and 12" wide, as well as wires and rods. Three steel rollers are configured to draw the workpiece through a path that will produce the desired results (see **Figures 16–17**).

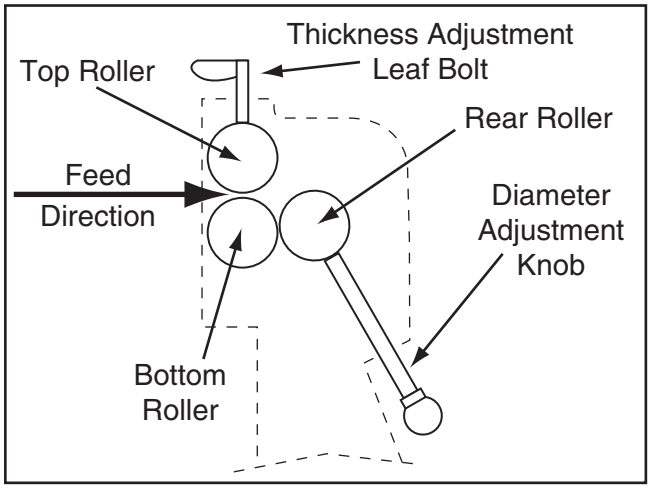


Figure 16. Side profile of the slip rollers and controls.

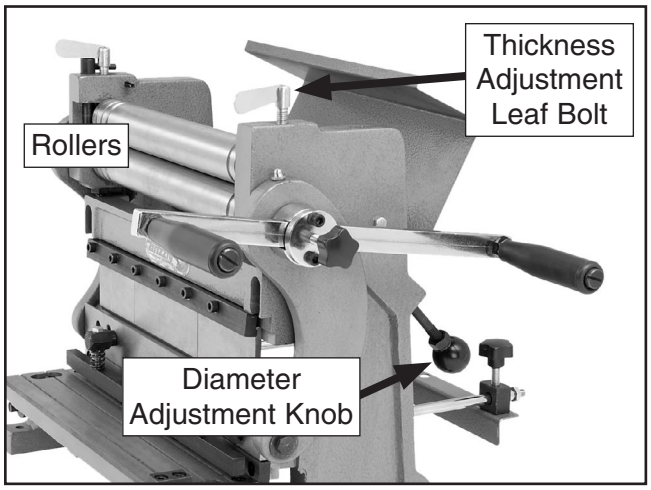
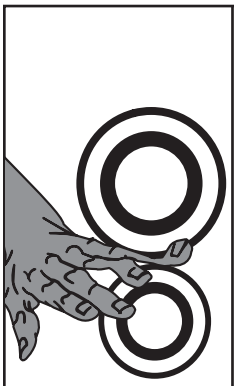


Figure 17. Slip rollers and controls.

Slip Roll Tips

- Due to the many variables of different sheet metal types, no single configuration of the rollers will create the same curve on all materials. Rolling sheet metal to achieve an exact radius is a trial-and-error process.
- Performing multiple passes through the machine with gradual reductions in the curve radius produces better results than trying to make the curve in one pass.
- To avoid pitted workpieces and damage to the roller surfaces, always make sure the workpiece and the rollers are free of grit and any foreign material before every use.
- Unless the operation requires a cone-type curve, always keep the rear roller parallel to the front rollers by rotating the diameter adjustment knobs the same amount.

Flat Rolling



⚠CAUTION

The rollers of this machine present a pinching hazard. Make sure no body part or clothing is near the rollers during operation. Failure to follow this warning may result in fingers, hair, or clothing being pulled into the machine, causing personal injury.

The Model T21320 can be used to straighten or flatten workpieces.

Note: *In the following procedures, adjustments must be made at both ends of the rollers, even if just one adjustment location is mentioned.*

To flat roll a workpiece:

1. Use the diameter adjustment knobs to lower the rear roller until it is even with the level of the bottom roller, as illustrated in **Figure 18**.

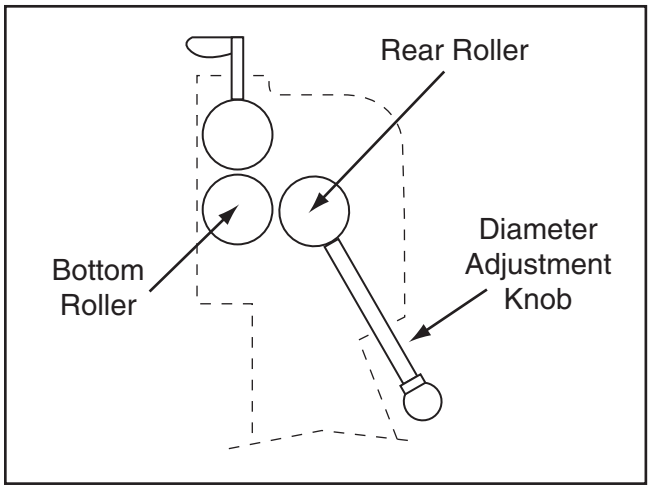


Figure 18. Bottom and rear rollers even.

2. Loosen the thickness adjustment leaf bolts until you can insert the workpiece between the upper and lower rollers, then evenly snug down the leaf bolts until you feel resistance and the workpiece is firmly held between the rollers, as illustrated in **Figure 19**.

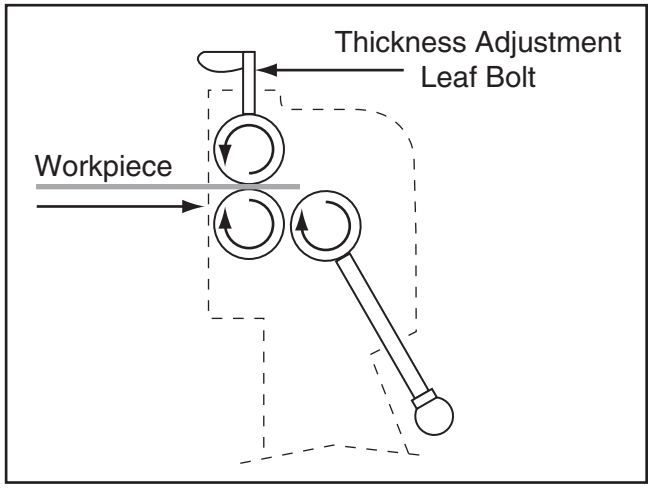


Figure 19. Top roller adjusted to the thickness of the workpiece.

3. Remove the workpiece, then evenly rotate the thickness adjustment leaf bolts clockwise ¼ turn to further lower the top roller to create additional pressure on the workpiece.

4. Insert the workpiece between the upper and lower rollers, then use the hand crank to draw the workpiece through the machine.

   Note: *Have an assistant support long workpieces as they leave the machine so they do not bend down.*

5. Repeat **Steps 3–4** until the desired results are produced.

Creating Curves

Your sheet metal machine can easily create constant-radius curves in sheet metal up to 22 gauge in thickness.

The method of creating a specific radius is a trial-and-error process. Due to the many variations among metal workpieces, no single configuration of the rollers will reproduce the same curve in all materials. We recommend testing your roller configurations on scrap pieces that are the same dimension and material as your final workpiece.

To create a curve in the workpiece:

1. Use the diameter adjustment knobs to fully lower the rear roller below the level of the bottom roller, then rotate the thickness adjustment leaf bolts counterclockwise until the upper roller can be lifted with enough clearance for the workpiece.

NOTICE

Performing multiple passes through the machine with gradual reductions in the curve radius produces better results than trying to make the curve in one or two passes.

2. Insert the workpiece between the upper and lower rollers and just over the rear roller, as illustrated in **Figure 20**, then snug the thickness adjustment leaf bolts down to hold the workpiece secure. Make sure you tighten the leaf bolts the same amount.

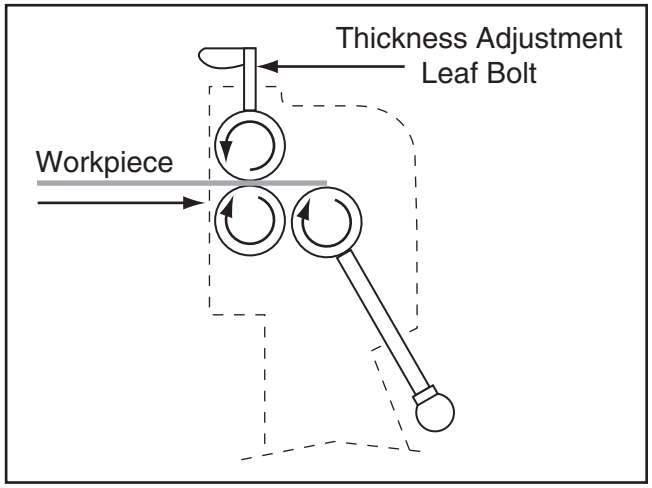


Figure 20. Workpiece positioned to start the curve.

3. Use the diameter adjustment knobs to raise the rear roller, then use the hand crank to pass the workpiece through the machine (see the illustrations in **Figure 21–22**).

   Note: *For good results, make the first bend less than the final radius, then slightly decrease the bend with each successive pass until the final radius has been reached.*

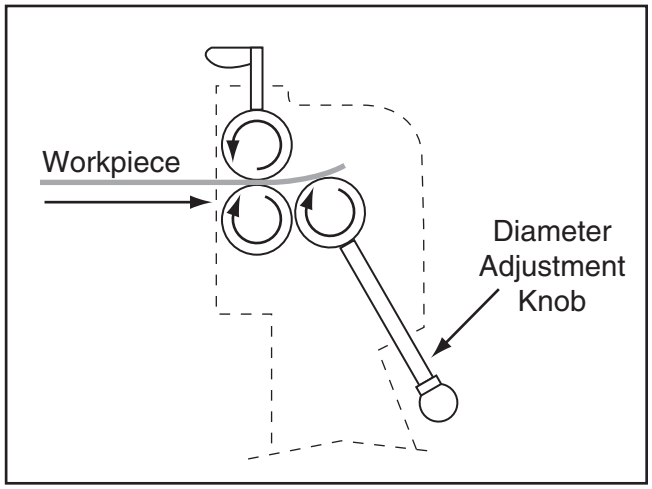


Figure 21. Starting the curve.

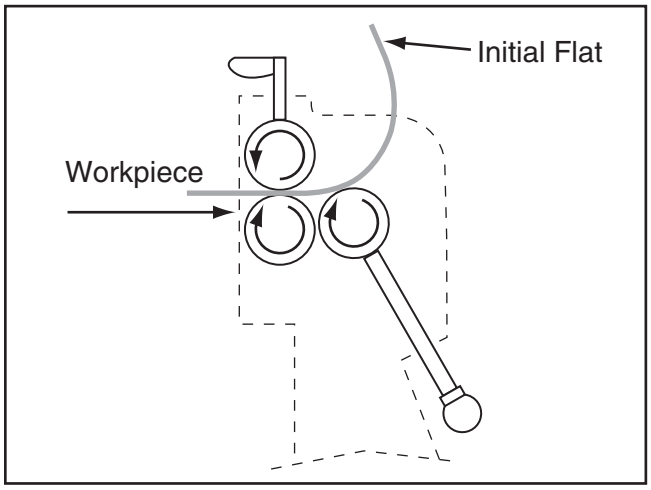


Figure 22. Creating a curve in the workpiece.

Note: *If your workpiece has an undesired initial flat, as illustrated in **Figure 22**, you can remove it by flipping the workpiece around and pass it through the front of the machine so that the initial flat enters last.*

4. Slightly tighten the diameter adjustment knobs the same amount, then pass the workpiece through the rollers again.

   Note: *To make a cone, tighten one adjustment knob more than the other.*

5. Repeat **Step 4** until you have produced the desired curve.

Creating Cylinders

The Model T21320 Slip Roll can be used to easily and accurately create cylinders.

If you know the diameter of the cylinder you want to create, use the formula below to calculate the length of material needed.

$$C=\pi D$$

C=Circumference
(Length of Material Needed)

π=Pi (Approximately 3.142)

D=Diameter

Example: Suppose you want to create a 6" diameter cylinder. You would use the above formula as follows:

$C=\pi D$
C=(3.142) x 6"
C=18.852"

The result of 18.852" indicates that you need to start with a piece of sheet metal that is approximately 18.852" in length in order to create a 6" diameter cylinder.

You can use the slip roll to create a bend with the correct radius so that the two ends meet, forming a 6" diameter cylinder (**Figure 23**).

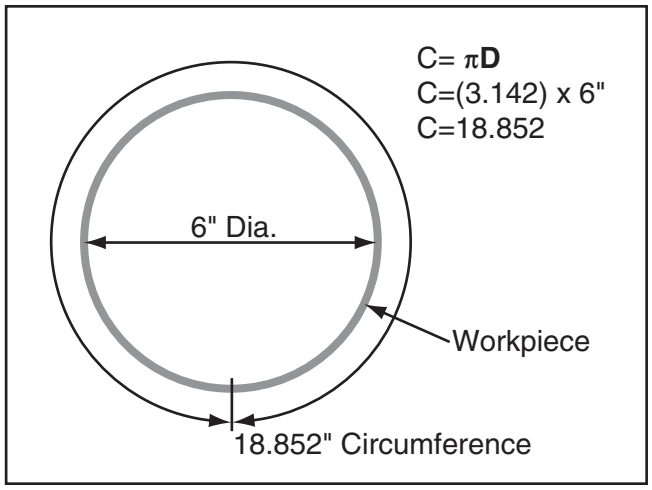


Figure 23. Calculating circumference example.

NOTICE

Performing multiple passes through the machine with gradual reductions in the curve radius produces better results than trying to make the curve in one or two passes.

To create a cylinder:

1. Use the diameter adjustment knobs to fully lower the rear roller below the level of the bottom roller, then rotate the thickness adjustment leaf bolts counterclockwise until the upper roller can be lifted with enough clearance for the workpiece.

2. Insert the workpiece between the upper and lower rollers and just over the rear roller, as illustrated in **Figure 24**, then snug the thickness adjustment leaf bolts down to secure the workpiece. Make sure you tighten the leaf bolts the same amount.

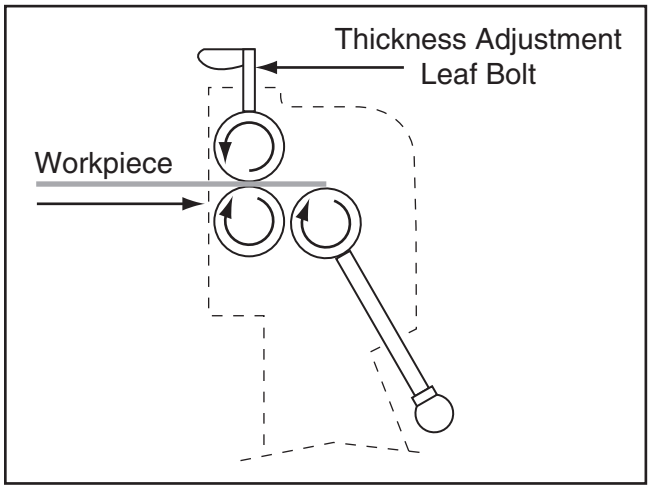


Figure 24. Workpiece positioned to start the curve.

3. Turn the hand crank clockwise to feed the workpiece through the machine until it is approximately half way through the upper and lower rollers.

4. Turn the diameter adjustment knobs clockwise knobs to lift the rear roller until the desired radius bend is reached, as illustrated in **Figure 25**. Make sure to turn the knobs equal amounts so the rear roller is always parallel with the other rollers. Failure to do so will create a larger radius on one end than the other, resulting in a cone shape.

   Note: Always *err on the side of making the radius too large rather than too small. It is easy to decrease the radius but very difficult to increase the radius later.*

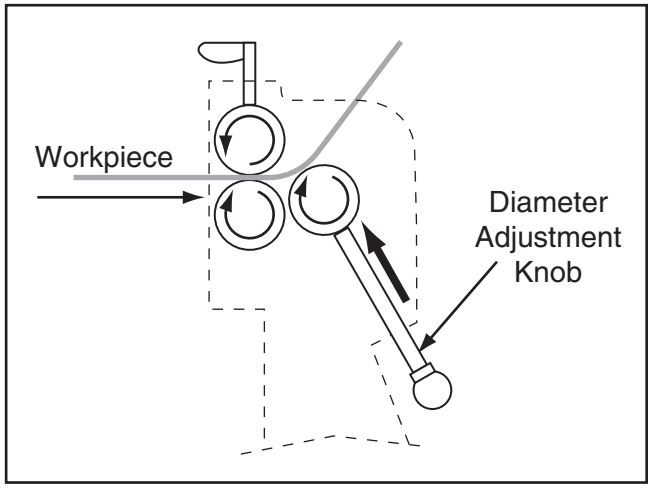


Figure 25. Making the initial bend to create a cylinder.

5. Turn the hand crank to process the material through the slip roll. Continue turning until the workpiece is completely through the upper and lower rollers, as illustrated in **Figure 26**.

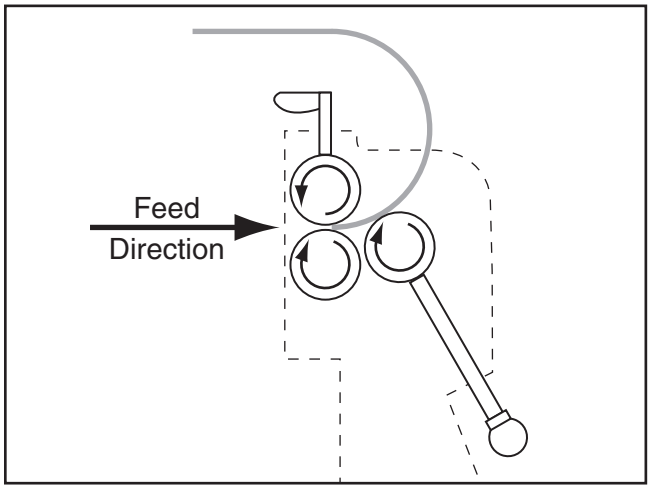


Figure 26. Finishing the first pass.

6. Rotate the workpiece 180°, insert the curved end into the rollers, then process it through the machine, as illustrated in **Figure 27**.

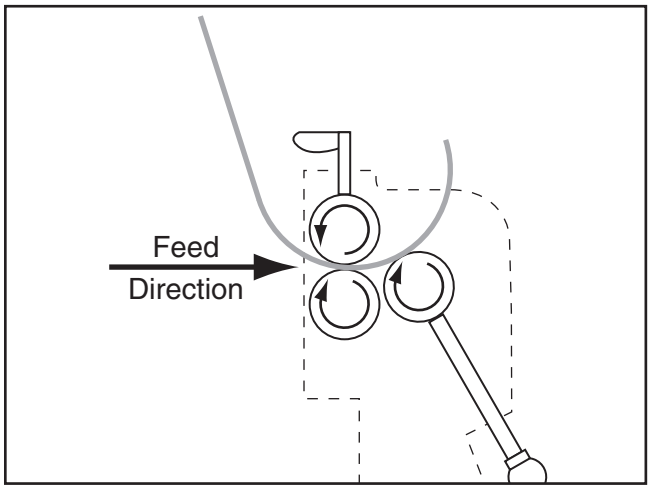


Figure 27. Curving the workpiece from the opposite end.

7. Reduce the radius of the curve by raising the rear roller, then repeat **Steps 4–7** until you have produced the desired cylinder (see the illustration in **Figure 28**).

   —If the ends of the cylinder do not meet, lift the rear roller equally at both ends, then process the entire cylinder through the slip roll again. Repeat as necessary.

   —If the ends of the cylinder overlap, remove the cylinder as described in **Removing Workpiece** on **this page**. Then, either attempt to increase the radius by manually bending it, or scrap the workpiece and start this procedure again with a new blank.

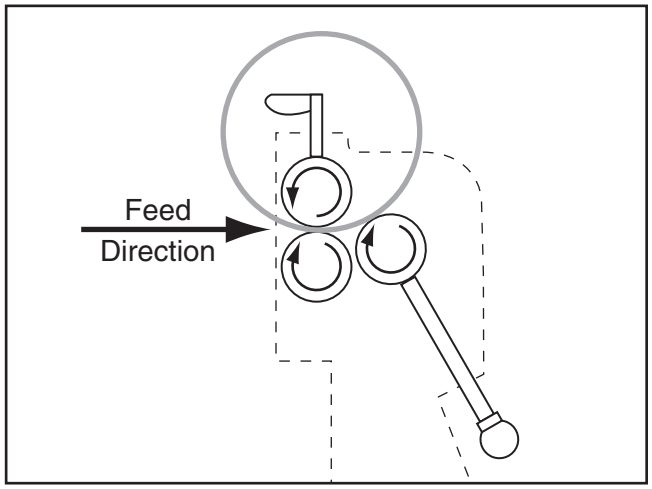


Figure 28. Cylinder completed.

8. When the cylinder is complete, refer to **Removing Workpiece** on **this page** for detailed instructions on removing the cylinder from the top roller.

Removing Workpiece From Rollers

To remove the workpiece from the top roller:

1. Rotate the top roller retainer pin until the flat portion of the pin is facing toward the roller or to the right, as shown in **Figure 29**.

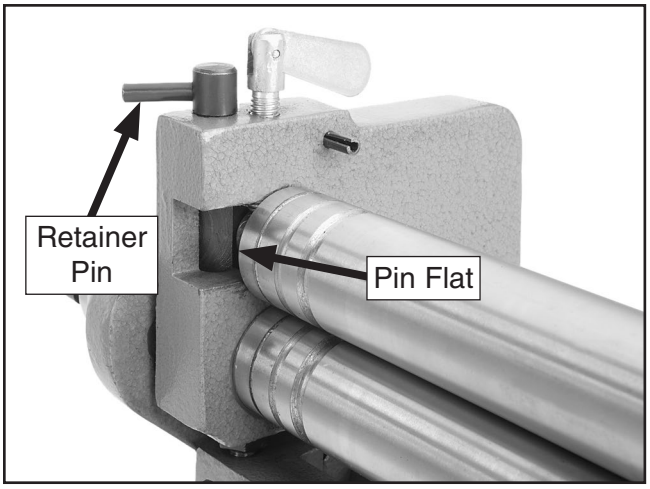


Figure 29. Top roller retainer pin rotated to release the roller.

2. Rotate the thickness leaf bolts clockwise until they no longer apply pressure to the top roller.

⚠CAUTION

The sharp edges of sheet metal can quickly cut your hands. Always use caution and heavy leather gloves when handling sheet metal.

3. Protect your hands from the sharp edges of the workpiece, then grasp the top roller and use moderate force to pull it forward, as shown in **Figure 30**.

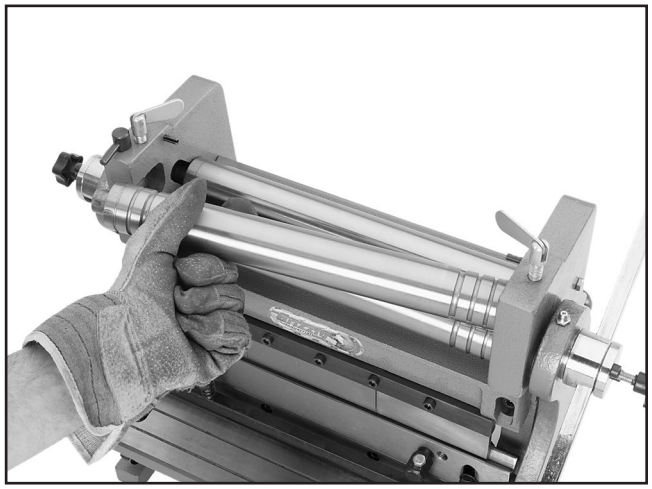


Figure 30. Releasing the top roller (shown without a workpiece for photo clarity).

4. Remove the workpiece, slide the top roller back into place, then secure the roller by rotating the retainer pin until the flat is no longer visible.

Bending Wire

Your sheet metal machine can bend wires, rods, and small-diameter tubing between the diameters of 1/8" and 13/64" (see **Figure 31**).

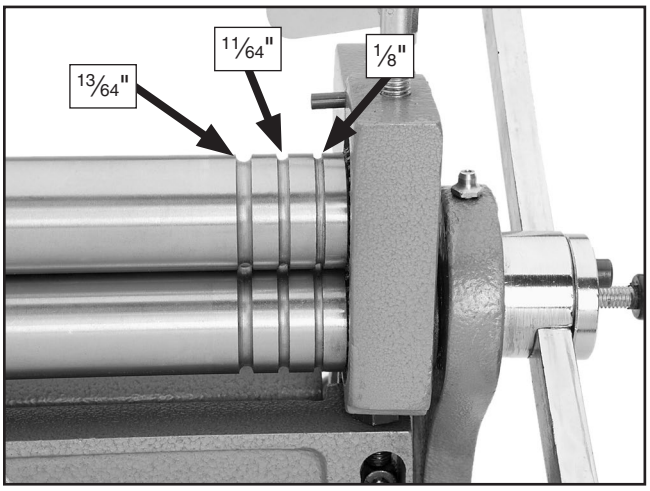


Figure 31. Slip roller wire grooves.

To ensure even pressure on the material, place the workpiece in the smallest possible groove on either side of the rollers. Although a 7/64" rod would fit into any of the wire grooves, you would use the 1/8" groove since it is the smallest possible groove the rod will fit into.

Process the material through the machine in the same manner described on the previous pages for sheet metal.

Note: *The wire grooves can also be used when rolling sheet metal that has a wire bead on the side.*

⚠CAUTION

Due to the considerable forces exerted on this machine when in operation, you MUST securely mount it to a stable and sturdy workbench or stand. Otherwise, the machine could tip or fall and result in personal injury or property damage.

Brake Overview

The brake of the Model T21320 is used to make bends 0°–90° in sheet metal up to 22 gauge in thickness and 12" in width. When you use the hand crank, the brake fingers force the workpiece into the groove of the finger receiver to make the desired bend (see **Figures 32–33**).

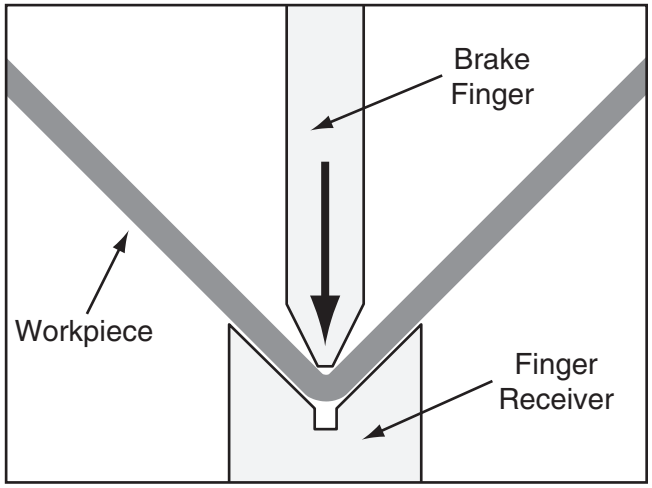


Figure 32. Illustrated side profile of the brake fingers and receiver.

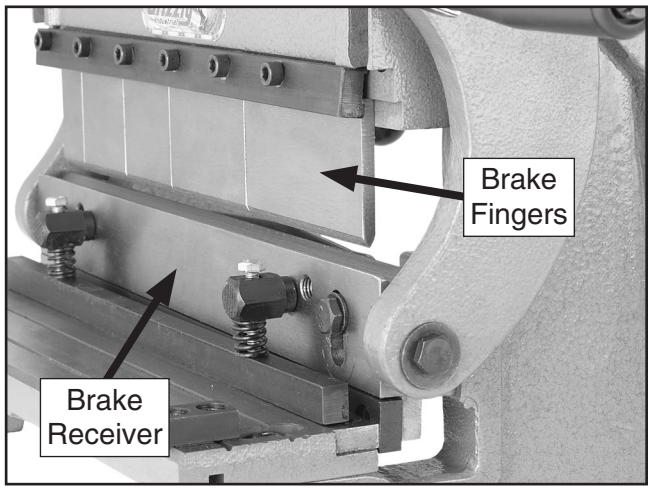


Figure 33. Brake fingers and receiver.

Bend Allowance

When metal is bent, the outside overall dimension increases from its original length—this amount is called the bend allowance. A typical bend allowance for a 90° bend in a 22 gauge mild steel workpiece is approximately 0.050". That means you need to start with a workpiece that is approximately 0.050" shorter than the desired outside length of the finished workpiece, as illustrated in the example of **Figure 34**.

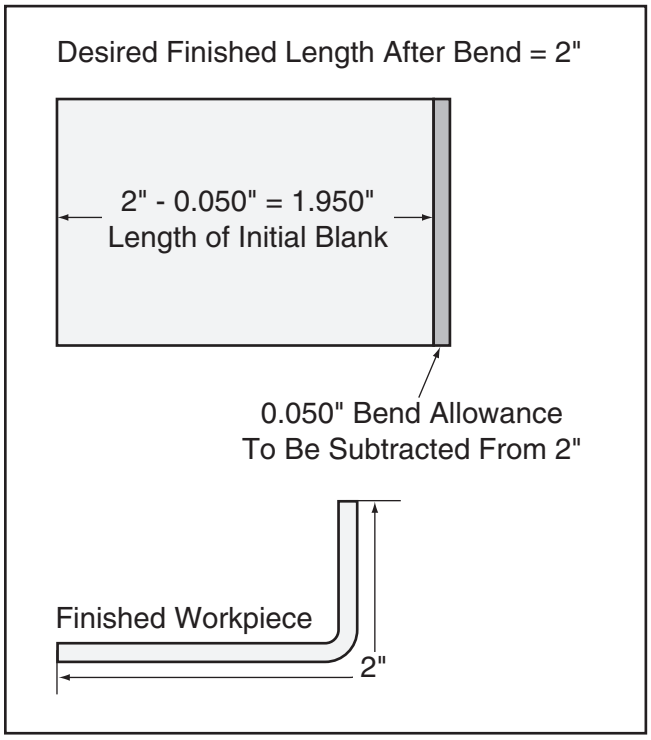


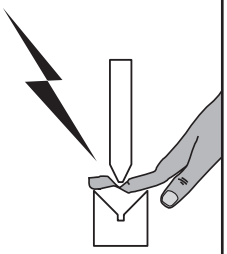
Figure 34. Example of accounting for bend allowance.

Calculating the bend allowance for your operation requires many variables, such as metal thickness, type of material, radius of the bend, etc. Detailed information for calculating the bend allowance can be found in metalworking handbooks and on the internet.

An easy way to find the correct dimension of your initial blank is to measure a piece of scrap of the same material as the workpiece, make the bend, then measure the piece again. The difference between the two measurements is the bend allowance, which you subtract from the dimension of the workpiece blank before the bend.

Bending Sheet Metal

Tip: *To reduce the chance of scoring your workpiece when using the brake, always keep the fingers and receivers clean and lubricated (refer to **Steps 8–13** beginning on **Page 12** for detailed instructions), and free of burrs or other blemishes. Also, apply a strip of sturdy tape along the top and bottom of the bend line.*



⚠WARNING

The brake fingers on this machine presents a pinching hazard. Make sure no body part or clothing is near the area where metal bending occurs. Failure to follow this warning may result in severe personal injury.

To bend sheet metal:

1. Mark a line along the width of the workpiece where the bend is to take place.

2. Use the hand crank to lower the finger receiver until you can position the workpiece underneath the fingers with the bend line aligned with the tips, as shown in **Figure 35**.

   Note: *When performing the same bending operation on multiple parts, use the rear work stop to save time positioning the workpieces.*

Figure 35. Positioning the workpiece for a bend.

3. While holding the workpiece steady, use the hand crank to raise the finger receiver to perform the desired bend (see **Figure 36** for an example), then lower the receiver and remove the workpiece.

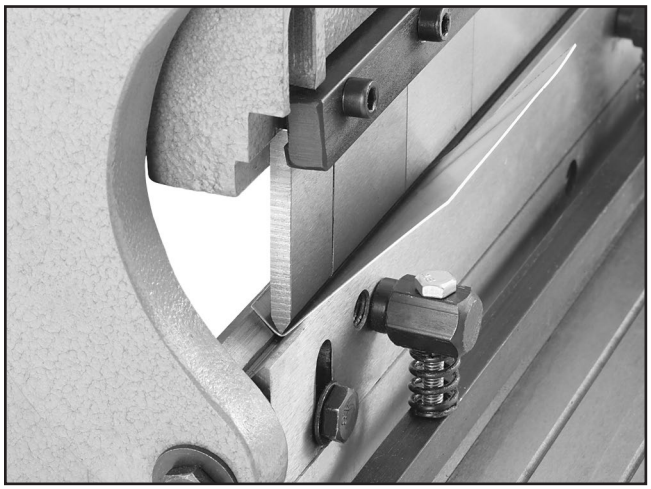


Figure 36. 90° bend completed.

4. If a reverse bend is required, re-install the workpiece upside-down, as shown in **Figure 37**, and repeat **Steps 2–3**. The minimum reverse bend possible is ¾".

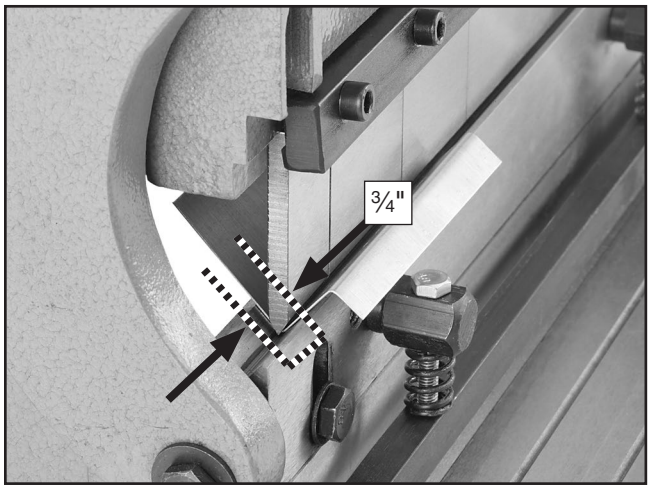


Figure 37. Minimum reverse bend.

Note: *When performing a pan and box bending operation, loosen the cap screws on the brake finger gib and configure the fingers for your operation. Remove the fingers you do not need.*

Shearing Overview

The Model T21320 has a set of reversible blades that shear mild steel up to 22 gauge in thickness and 12" in width. When you use the hand crank to perform a shear, the upper movable blade is lowered past the fixed table blade, creating a shearing action (see **Figures 38–39**). For repetitive cuts, use the adjustable rear work stop.

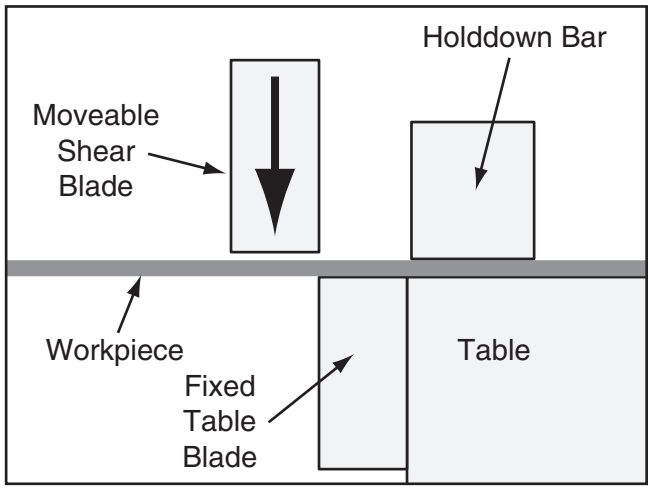


Figure 38. Illustrated side profile of the shear components.

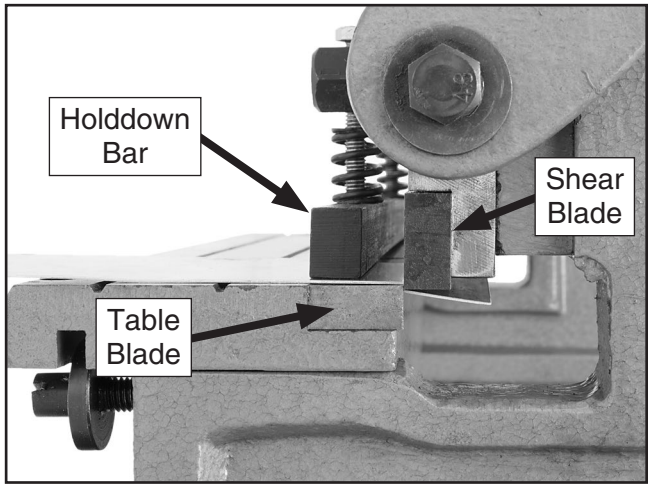
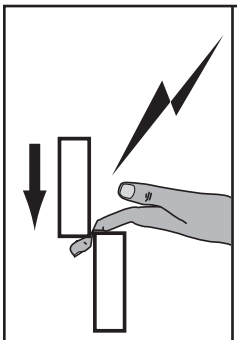


Figure 39. Shearing action (side view).

Cutting Sheet Metal



⚠WARNING

The shearing blades on this machine present an amputation hazard. Make sure no body part or clothing is near the area where metal shearing occurs. Failure to follow this warning may result severe personal injury.

To cut sheet metal:

1. Mark the cut line across the width of the workpiece.

2. Make sure the gap between the shearing blades is correct for the workpiece material (refer to **Shearing Blade Gap Adjustment** on **Page 32** for detailed instructions).

3. Position the workpiece up against the guide block on the right side of the table, then align the cut mark with the upper shear blade, as shown in **Figure 40**.

   Note: *The shearing action begins on the right side of the workpiece and moves to the left.*

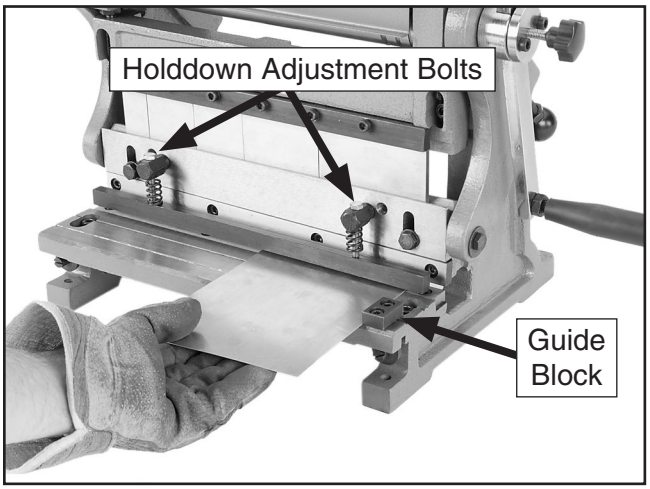


Figure 40. Positioning the workpiece for a cut.

NOTICE

If you need to adjust the gap between the shearing blades to accommodate your workpiece, refer to the *Shearing Blade Gap Adjustment* subsection on *Page 32* for detailed instructions.

Note: *If you are using the rear work stop, adjust the stop so that at least one square edge of the workpiece is against it.*

4. Use the holddown adjustment bolts to adjust the holddown bar so that it firmly holds the workpiece in place without marking or denting it.

5. Keeping all body parts away from the blades, rotate the hand crank with an even and steady pressure to complete the cut.

Material Thickness

The Model T21320 is designed to bend and shear mild steel sheet metal up to 22 gauge in thickness.

The higher the gauge number, the thinner the material. Also, different materials have slightly different thicknesses for the same gauge, as shown in the chart of **Figure 41**. Make sure you use a quality set of calipers to verify the material thickness in inches before using it in operation.

Keep your workpiece material equal to or thinner than that of 22 gauge mild steel sheet metal, which is 0.0299" thick.

Gauge	Mild Steel	Alum-inum	Gal. Steel	Stainless Steel
22	0.0299"	0.0253"	0.0336"	0.0312"
24	0.0239"	0.0201"	0.0276"	0.0250"
26	0.0179"	0.0159"	0.0217"	0.0187"
28	0.0149"	0.0126"	0.0187"	0.0156"
30	0.0120"	0.0100"	0.0157"	0.0125"
32	0.0097"	0.0080"	0.0134"	0.0102"

Figure 41. Equivalent material thickness chart.

SECTION 4: ACCESSORIES

H5614—Wire Gauge US Standard
Calibrated for sheet metal sized from 0 to 30 gauge. The front is marked with gauge sizes, the back is marked with actual inch measurements.

Figure 42. H5614 Wire Gauge.

G5562—SLIPIT® 1 Qt. Gel
G5563—SLIPIT® 12 oz Spray
G2871—Boeshield® T-9 12 oz Spray
G2870—Boeshield® T-9 4 oz Spray
H3788—G96® Gun Treatment 12 oz Spray
H3789—G96® Gun Treatment 4.5 oz Spray

Figure 43. Recommended products for protecting unpainted cast iron/steel part on machinery.

Call 1-800-523-4777 To Order

H6073—Deluxe Power Snip
Lightweight aluminum cast handles. Full 3½" length of cut. Replaceable steel blades. Fully enclosed finger loops protect hands from sharp edges. Long handles provide plenty of leverage. Multi-purpose snip for sheet metal, vinyl and plastic.

Figure 44. Model H6073 Deluxe Power Snip.

G5618—De-burring Tool with two Blades
G5619—Extra Aluminum Blades
G5620—Extra Brass and Cast Iron Blade
The quickest tool for smoothing freshly sheared metal edges. Comes with two blades, one for steel and aluminum and one for brass and cast iron.

Figure 45. G5618 De-burring tool.

G4956—Super Nibbler
The super nibbler is just the ticket for cutting sheet metal up to 3/64" thick. Extremely narrow headed design allows cuts in hard-to-reach areas, yet still features a safety guard to prevent flying splinters. 10¼" overall.

Figure 46. Model G4956 Super Nibbler.

H5958—Sheet Metal Pliers
For bending and forming sheet metal. Jaws are 3½" side. Rubber grips. Overall length is 8". Ideal for HVAC Installers.

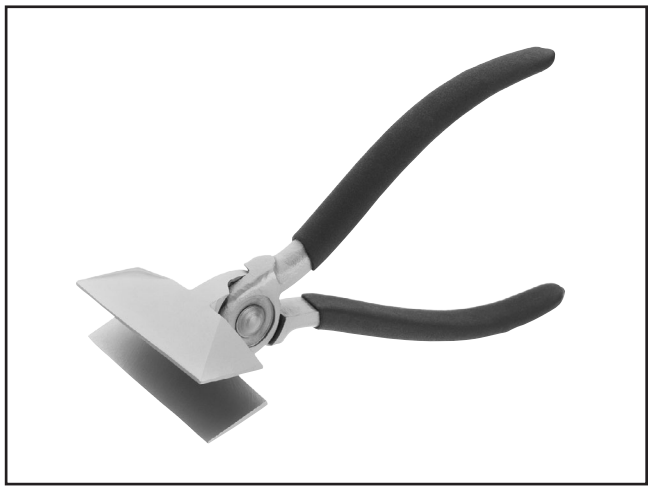


Figure 47. Model H5958 Sheet Metal Pliers.

Call 1-800-523-4777 To Order

G8781—4½" Suction Cup
Handle plate glass, glass mirrors and sheet metal with safety and security. Simple hand lever action provides tremendous gripping power on any flat, smooth material. Buy two Suction Cups for two-handed control!

Figure 48. Model G8781 4½" Suction Cup.

G9256—6" Dial Caliper
G9257—8" Dial Caliper
G9258—12" Dial Caliper
These traditional dial calipers are accurate to 0.001" and can measure outside surfaces, inside surfaces, and heights/depths. Features stainless steel, shock resistant construction and a dust proof display. An absolute treat for the perfectionist!

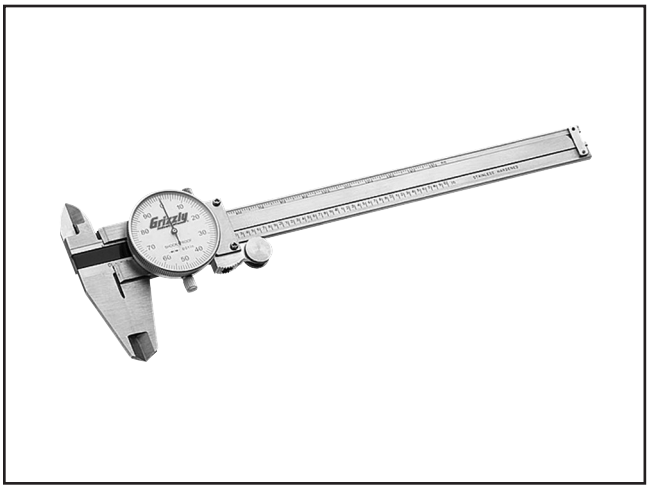


Figure 49. Grizzly® Dial Calipers.

SECTION 5: MAINTENANCE

Schedule

For optimum performance from your machine, follow this maintenance schedule and refer to any specific instructions given in this section.

Daily Maintenance:
- Clean the machine.
- Tighten loose mounting bolts.
- Check/replace damaged rollers.
- Check/replace cracked or damaged brake fingers or receiver (**Page 34**).
- Sharpen/replace dull or nicked shearing blades (**Page 31**).
- Any other unsafe condition.

Monthly Maintenance:
- Lubricate the gears and hand crank bushings.

Semi-Annual Maintenance:
- Lubricate the roller bushings.

Cleaning & Protecting

Cleaning the Model T21320 is relatively easy. Use shop rags and mineral spirits to wipe down the machine.

Protect the unpainted cast iron and exposed metal surfaces (such as the rollers and the brake/shear components) with regular applications of products like G96® Gun Treatment, SLIPIT®, or Boeshield® T-9 (see **Section 5: Accessories** on **Page 26** for more details).

Lubrication

Keep your Model T21320 properly lubricated to help ensure long life and smooth operation of the machine.

Gears

Clean away grease and built-up grime from the top and bottom roller gear teeth, as shown in **Figure 50**, with a stiff brush and mineral spirits. When dry, apply a small amount of grease to the teeth, then use the hand crank to rotate the rollers and distribute the lubricant.

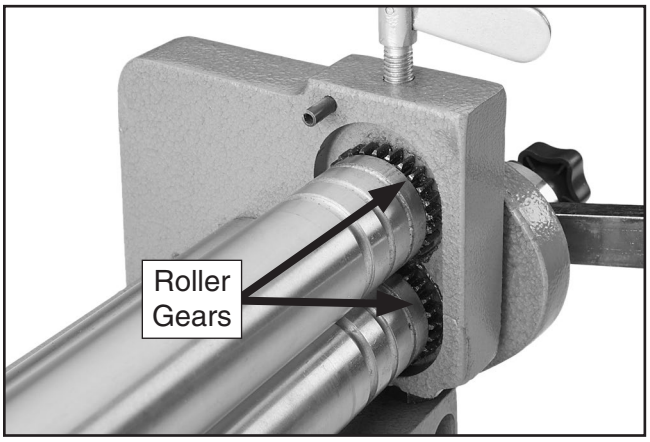


Figure 50. Top and bottom roller gears.

Continued on next page ➔

Hand Crank Bushings

Wipe off the grease fittings next to each hand crank hub (see **Figure 51**), then use a grease gun to add a small amount of multi-purpose grease to the hand crank bushings.

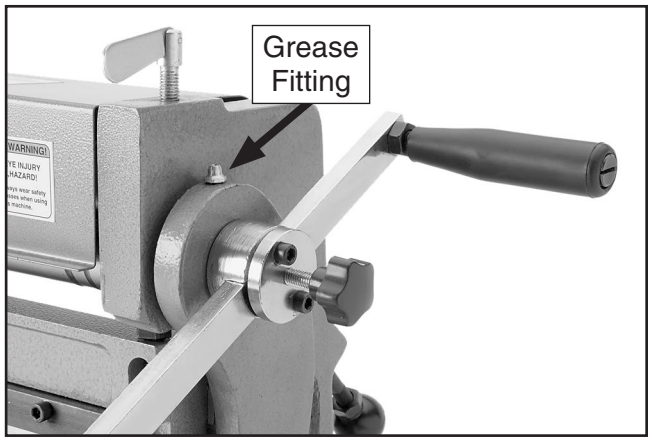


Figure 51. Hand crank grease fitting.

Roller Bushings

Remove the top roller from the machine, then remove the bushings from the ends of the roller (see **Figure 52**). Use a shop rag and mineral spirits to clean the bushings and the ends of the roller, then apply a thin coat of multi-purpose grease to the roller ends and re-install the bushings.

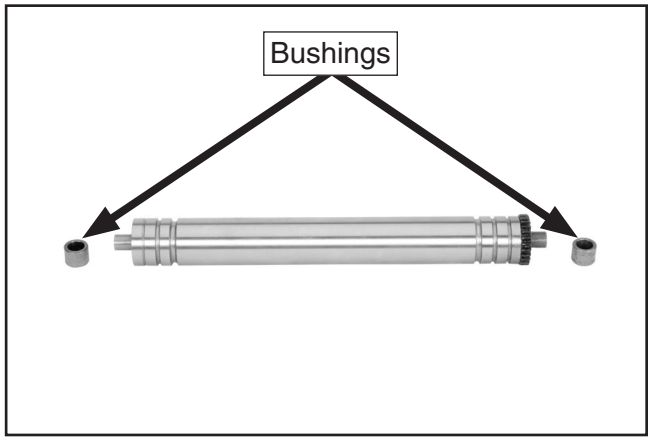


Figure 52. Bushings removed from the top roller.

Use a stiff brush and mineral spirits to clean the rear roller bushings (see **Figure 53**), then apply a small amount of multi-purpose grease to them. Re-install the top roller and close the cover.

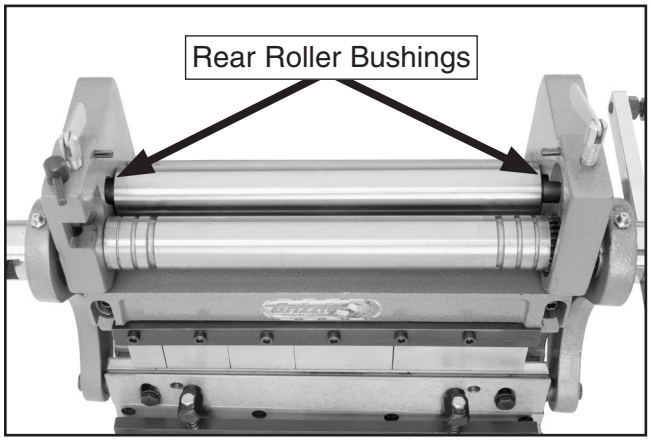


Figure 53. Rear roller bushings.

SECTION 6: SERVICE

Review the troubleshooting and procedures in this section to fix or adjust your machine if a problem develops. If you need replacement parts or you are unsure of your repair skills, then feel free to call our Technical Support at (570) 546-9663.

Troubleshooting

Slip Roll Operation

Symptom	Possible Cause	Possible Solution
Slip roll creates cones when trying to make a cylinder.	1. Top and rear rollers not parallel.	1. Use the diameter adjustment knobs to make the rollers parallel.
Creases or wrinkles in the workpiece.	1. Excessive pressure applied when rolling.	1. Reduce the radius and perform the bend in several light passes.
Workpiece is pitted or scratched.	1. Workpiece or rollers are dirty or damaged.	1. Thoroughly clean the workpiece and rollers. Polish out any nicks/burrs in the rollers, or replace them.

Brake Operation

Symptom	Possible Cause	Possible Solution
Heavy resistance during bending.	1. Machine capacities are exceeded.	1. Operate within the listed capacities of the machine.
Bend radius is not consistent across workpiece.	1. Machine capacities are exceeded. 2. Fingers and receiver not aligned.	1. Operate within the listed capacities of the machine. 2. Properly align the fingers and receiver (**Page 34**).
Tips of brake fingers are chipping or rolling.	1. Fingers and receiver not aligned. 2. Workpiece is too thick.	1. Properly align the fingers and receiver (**Page 34**). 2. Operate within the listed capacities of the machine.
Workpiece has scoring marks.	1. Fingers or receiver scratched.	1. Polish out scratches, and apply tape at the bend locations for further protection.

Shear Operation

Symptom	Possible Cause	Possible Solution
Machine will not cut workpiece.	1. Cut exceeds machine capacities. 2. Not enough gap between blades.	1. Operate within the listed capacities of the machine. 2. Increase blade gap (**Page 32**).
Cuts are not square.	1. Uneven contact with guide or work stop. 2. Blade gap unequal across length. 3. Too much bow in blade. 4. Inadequate holddown pressure.	1. Maintain proper contact with guide and work stop. 2. Properly adjust blade gap for material (**Page 32**). 3. Properly adjust blade bow (**Page 33**). 4. Properly adjust holddown pressure.
Poor quality of cuts with ripping or tearing.	1. Dull blades. 2. Incorrect blade gap setup. 3. Loose blades.	1. Reverse/sharpen/replace blades (**Page 31**). 2. Properly adjust blade gap for material (**Page 32**). 3. Remove blades, clean thoroughly, and re-install.

Shearing Blade Reversal/ Replacement

The shearing blades are reversible, so when the first cutting edge becomes dull, the blades can be rotated to use the second cutting edge.

When both cutting edges of the blade become dull, use wet grinding techniques for SK-4 metal or better to sharpen the cutting face of the blade. The upper shearing blade uses a 5° relief edge and the lower table blade does not.

However, if you are not comfortable performing the sharpening procedure or do not have access to a professional sharpening service, replacement blades are available through Grizzly.

Tools Needed	**Qty**
Wrench or Socket 10mm	1
Hex Wrench 5mm	1

To reverse or replace the shearing blades:

1. Remove the hex bolts and springs that secure the shear holddown bar (see **Figure 54**).

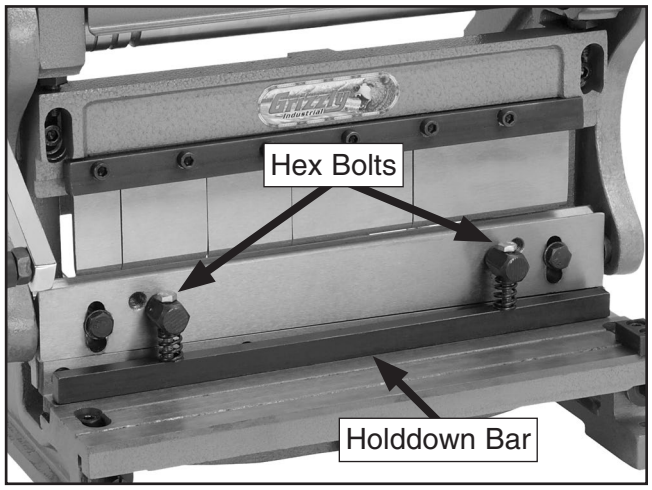


Figure 54. Shear holddown bar.

⚠CAUTION

The shearing blades are sharp and can quickly cut your hands. Always wear heavy leather gloves when handling the shearing blades to avoid this cutting hazard.

2. Remove the four cap screws that secure the blade, then carefully remove it from the machine (see **Figure 55**).

   Tip: *When removing or installing the upper shear blade, remove the cap screw at one end, then insert a small hex wrench or similar tool through the hole to keep the blade in place as you remove the rest of the cap screws.*

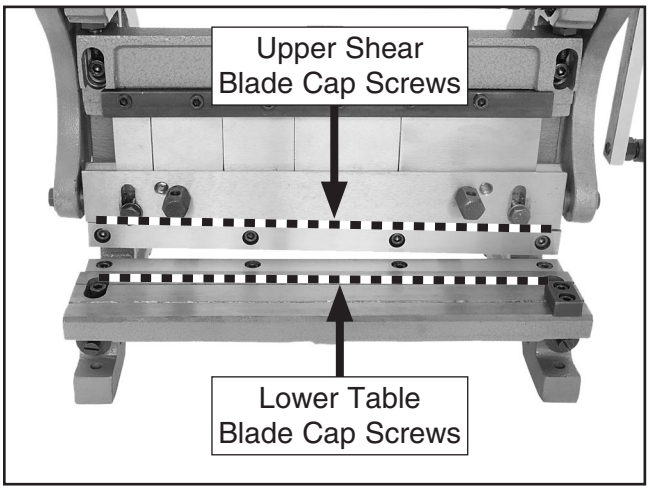


Figure 55. Shearing blade cap screws.

3. Inspect the blade cutting edge that was in use for wear, nicks, or burrs.

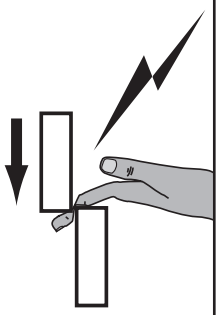
   —If the cutting edge shows wear or nicks and the other cutting edge has not been used, rotate the blade and re-install it.

   —If both cutting edges are worn or nicked, either properly sharpen the cutting face or replace the blade.

4. Re-install the holddown bar, then check that the shearing blade gap adjustment is correct as instructed in the **Shearing Blade Gap Adjustment** on **Page 32**.

Shearing Blade Gap Adjustment

The shearing blade gap adjustment determines the accuracy of the cut. Follow the procedures below to make sure this adjustment is correct for the workpiece material being processed.



⚠WARNING

The shearing blades on this machine presents an amputation hazard. Make sure no body part or clothing is near the area where metal shearing occurs. Failure to follow this warning may result in severe personal injury.

Performing the Shear Test

1. While keeping your fingers clear of the shear blades, shear a piece of scrap material that is the same as your workpiece along the full length of the blade, as shown in **Figure 56**, then inspect the cut.

Figure 56. Performing the shear test.

—If the machine correctly cuts to your satisfaction along the entire length of the blades, no adjustments are necessary.

—If the cut is clean at one end and not the other, perform the following **Adjusting the Shear Table** procedure on this page.

—If the condition of the cut on the ends is different from the cut in the middle, perform the following **Adjusting the Blade Bow** procedure on **Page 33**.

Adjusting the Shear Table

Tools Needed	**Qty**
Hex Wrench 6mm	1
Standard Screwdriver #2	1

To adjust the blade gap by moving the table:

1. Loosen the cap screws on either end of the shear table that secure it to the machine (see **Figure 57**).

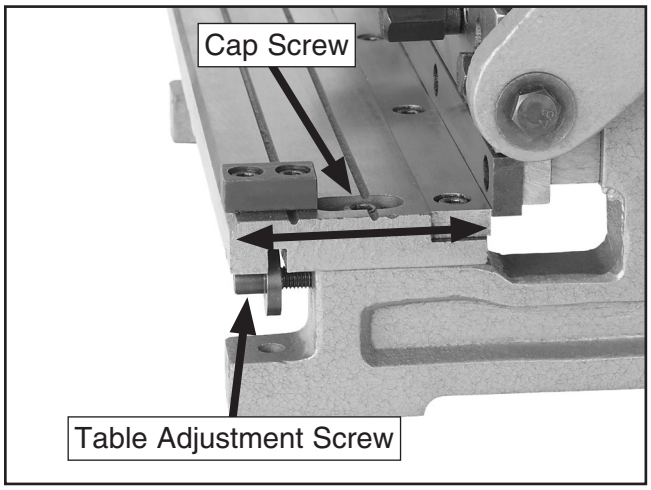


Figure 57. Table adjustment controls.

2. Evenly rotate the table adjustment screws to adjust the position of the shearing table until the blade gap is even, then re-tighten the cap screws to secure the table in place.

   Note: *Rotating the table adjustment screws clockwise moves the table toward the upper shear blade.*

3. Perform the previous shear test.

4. If necessary, repeat **Steps 1–3** until you are satisfied with the shear test cut.

Adjusting the Blade Bow

The adjustment bolt of the blade bow is used to remove any slight bow in the cast iron cross beam that the brake finger receiver and upper shear blade are attached to (see **Figure 58**).

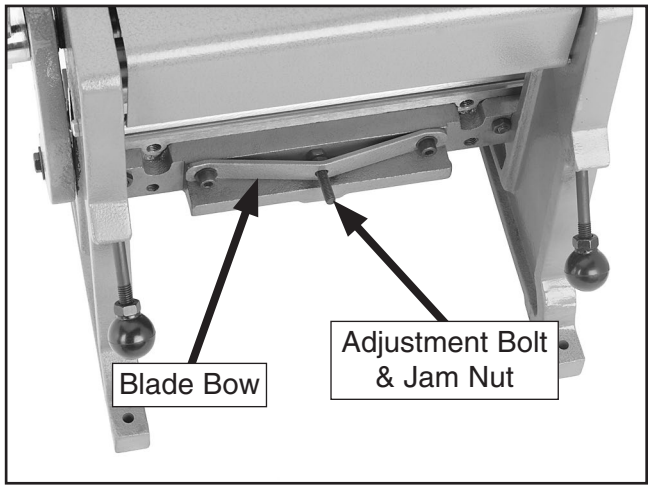


Figure 58. Blade bow.

Tools Needed **Qty**
Wrenches 14mm..... 2

To adjust the blade gap with the blade bow:

1. Hold the adjustment bolt still, then turn the jam nut to adjust the center of the cross beam in or out (see **Figure 58**).

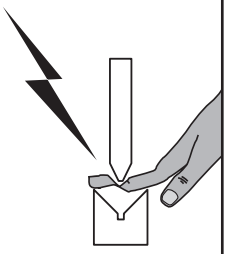
   —If the shear test cut was clean on the ends of the shear table but not in the middle, turn the jam nut counterclockwise to force the adjustment bolt against the cross beam, moving it in toward the front.

   —If the shear test cut was clean in the middle but not on the ends, rotate the jam nut clockwise to allow the cross beam to move back.

2. Perform the previous shear test.

3. If necessary, repeat **Steps 1–2** until you are satisfied with the shear test cut.

Brake Alignment



⚠WARNING

The brake fingers on this machine presents a pinching hazard. Make sure no body part or clothing is near the area where metal bending occurs. Failure to follow this warning may result in severe personal injury.

During the life of your machine, you may need to align the brake fingers with the finger receiver from side-to-side.

Tools Needed	**Qty**
Hex Wrench 6mm	1
Wrench 16mm	1
Heavy Flat Bar or Metal Ruler 12" Long	1

To align the brake:

1. Remove, clean, and de-burr all of the finger tips and the receiver groove, then inspect the fingers and receiver for any cracks or damage.

—If any of the brake fingers or the receiver are damaged in any way, DO NOT use the brake until you have replaced these parts with new ones.

2. Replace the fingers and properly seat them (refer to **Steps 8–13** beginning on **Page 12** for detailed instructions).

⚠CAUTION

Operating the brake with cracked or damaged brake fingers or receiver could cause these parts to shatter and fly apart, which could result in personal injury.

3. Place a piece of heavy flat bar stock or a heavy metal ruler approximately 12" long across the finger receiver, as shown in **Figure 59**.

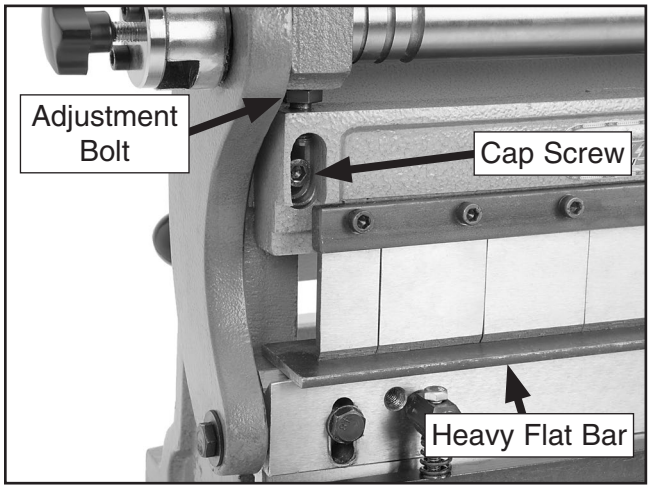


Figure 59. Checking brake finger alignment.

4. Lower the brake fingers until one just rests on the metal bar, as shown in **Figure 59**.

5. Starting at one end, visually check the gap between the brake fingers and the metal bar.

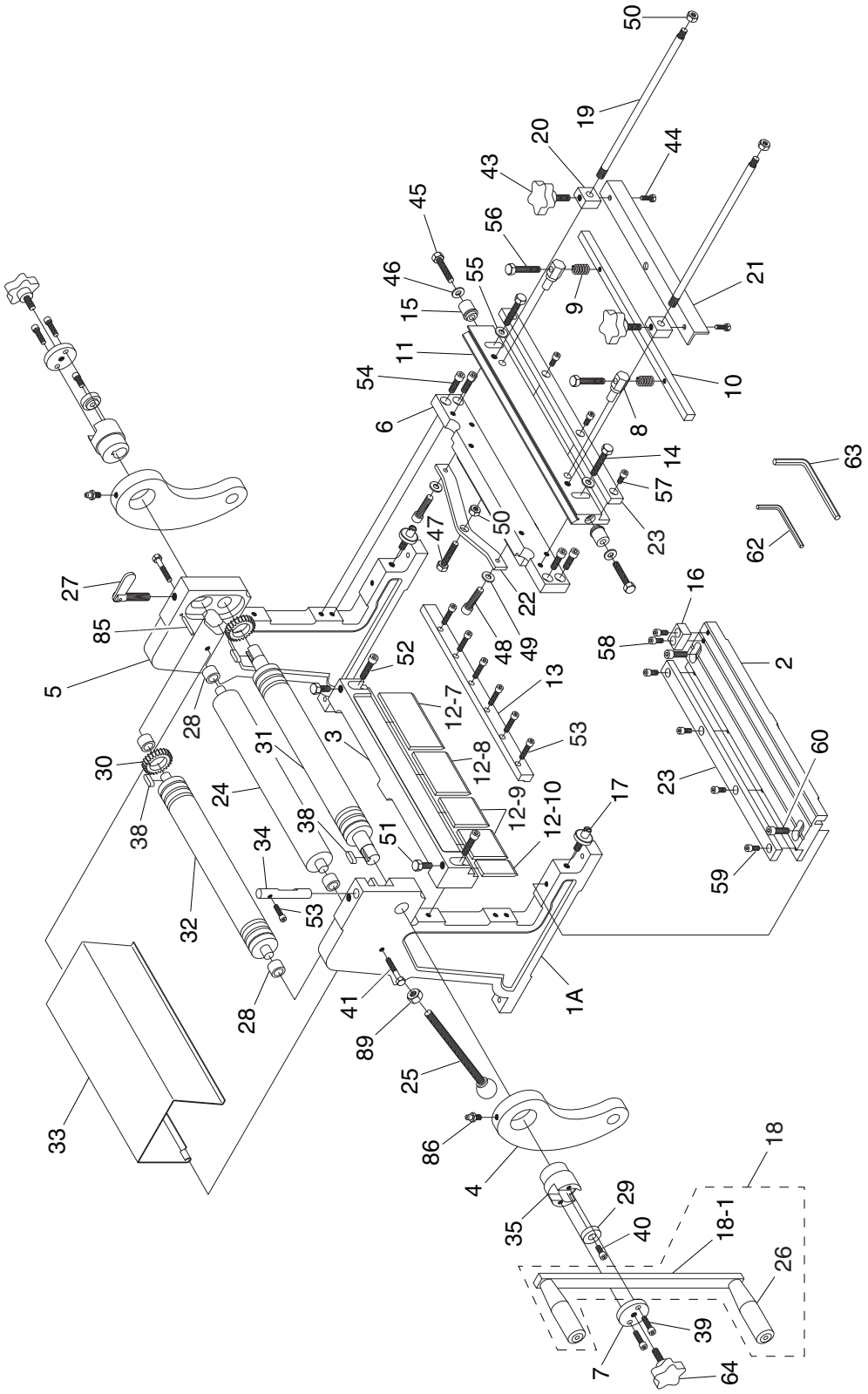
6. If you find a gap at one end of the brake, loosen the cap screw shown in **Figure 59** on that end, then turn the adjustment bolt counterclockwise until the gap disappears.

7. Re-tighten the cap screw, remove the metal bar, and use the hand crank to cycle the machine 2–3 times.

8. Repeat **Steps 3–7** until the brake fingers rest evenly on the metal bar along its entire length.

SECTION 7: PARTS

Main Breakdown

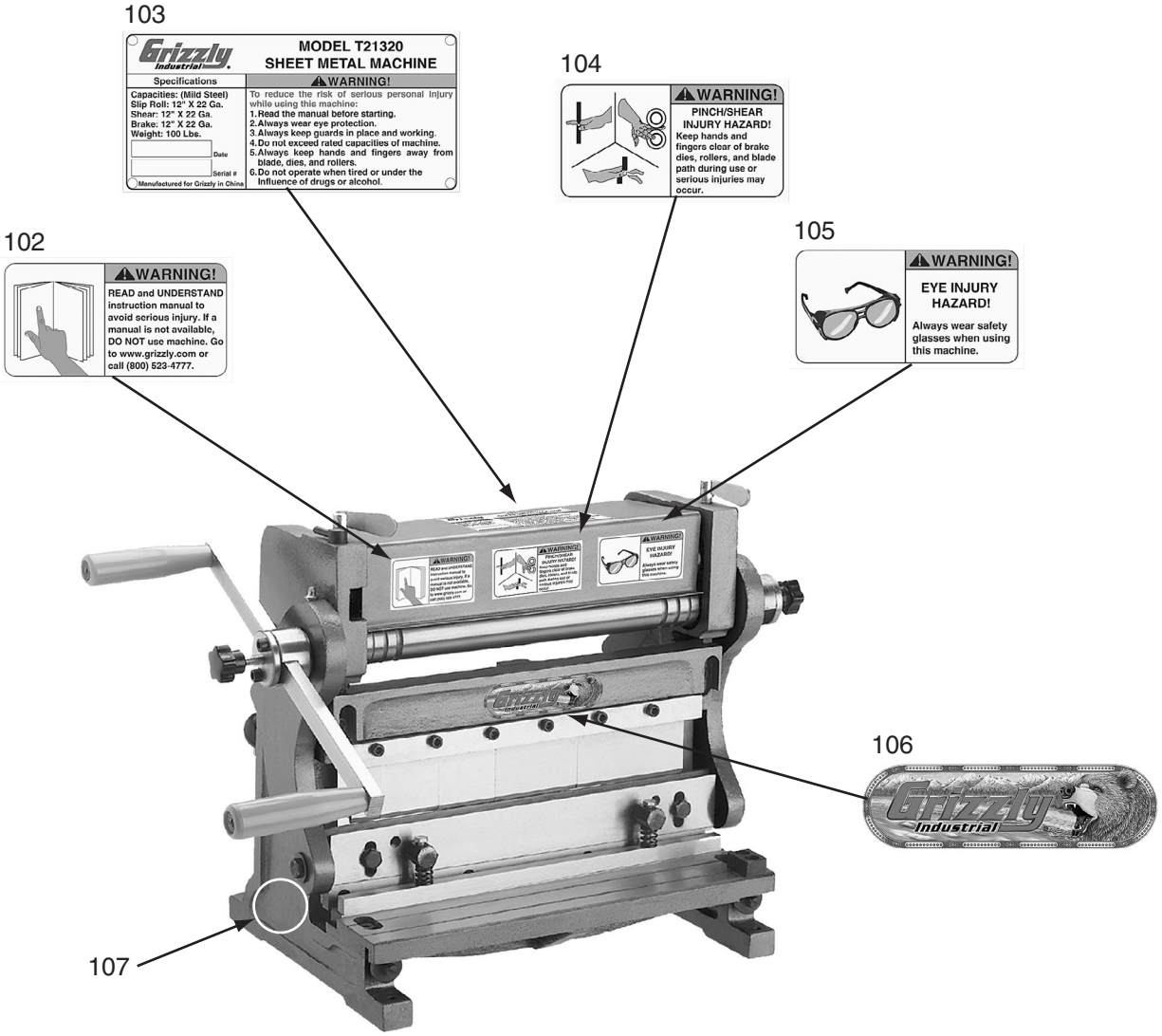


Main Parts List

REF	PART #	DESCRIPTION
1A	PT21320001A	LEFT FRAME V2.12.06
2	PT21320002	SHEARING TABLE
3	PT21320003	TOP CROSSBEAM
4	PT21320004	CRANK ARM
5	PT21320005	RIGHT FRAME V2.03.99
6	PT21320006	BOTTOM CROSSBEAM
7	PT21320007	CRANK HUB END CAP
8	PT21320008	HOLDDOWN STUD
9	PT21320009	COMPRESSION SPRING
10	PT21320010	HOLDDOWN BAR
11	PT21320011	FINGER RECEIVER
12-7	PT21320012-7	BRAKE FINGER 4"
12-8	PT21320012-8	BRAKE FINGER 3"
12-9	PT21320012-9	BRAKE FINGER 2"
12-10	PT21320012-10	BRAKE FINGER 1"
13	PT21320013	FINGER GIB
14	PB126M	HEX BOLT M8-1.25 X 40
15	PT21320015	BUSHING
16	PT21320016	GUIDE BLOCK
17	PT21320017	TABLE ADJUSTMENT SCREW
18	PT21320018	HAND CRANK ASSEMBLY
18-1	PT21320018-1	HAND CRANK BAR
19	PT21320019	WORK STOP ROD
20	PT21320020	STOP BLOCK
21	PT21320021	WORK STOP PLATE
22	PT21320022	BLADE BOW
23	PT21320023	SHEAR BLADE
24	PT21320024	REAR SLIP ROLLER
25	PT21320025	DIAMETER ADJUSTMENT SCREW
26	PT21320026	HAND CRANK KNOB
27	PT21320027	THICKNESS LEAF BOLT
28	PT21320028	ROLLER BUSHING
29	PT21320029	CRANK HUB RETAINER
30	PT21320030	ROLLER GEAR

REF	PART #	DESCRIPTION
31	PT21320031	BOTTOM SLIP ROLLER
32	PT21320032	TOP SLIP ROLLER
33	PT21320033	SLIP ROLLER COVER
34	PT21320034	TOP ROLLER RETAINER PIN
35	PT21320035	HAND CRANK HUB
38	PK07M	KEY 6 X 6 X 20
39	PSB01M	CAP SCREW M6-1 X 16
40	PSB68M	CAP SCREW M6-1 X 8
41	PB05M	HEX BOLT M6-1 X 8
43	PT21320043	STAR KNOB
44	PB05M	HEX BOLT M6-1 X 8
45	PB126M	HEX BOLT M8-1.25 X 40
46	PW01M	FLAT WASHER 8MM
47	PB126M	HEX BOLT M8-1.25 X 40
48	PSB31M	CAP SCREW M8-1.25 X 25
49	PW01M	FLAT WASHER 8MM
50	PN03M	HEX NUT M8-1.25
51	PB70M	HEX BOLT M10-1.5 X 16
52	PCAP31M	CAP SCREW M8-1.25 X 25
53	PSB69M	CAP SCREW M6-1 X 24
54	PSB11M	CAP SCREW M8-1.25 X 16
55	PW01M	FLAT WASHER 8MM
56	PB71M	HEX BOLT M6-1 X 45
57	PSB04M	CAP SCREW M6-1 X 10
58	PSB04M	CAP SCREW M6-1 X 10
59	PSB04M	CAP SCREW M6-1 X 10
60	PSB14M	CAP SCREW M8-1.25 X 20
62	PAW05M	HEX WRENCH 5MM
63	PAW06M	HEX WRENCH 6MM
64	PT21320064	CRANK HANDLE LOCK KNOB
85	PT21320085	SLIP COVER STOP PIN
86	PT21320086	GREASE FITTING 5/16" X 3/16"
89	PN02M	HEX NUT M10-1.5

Label Placement



REF	PART #	DESCRIPTION
102	PLABEL-12D	READ MANUAL LABEL
103	PT21320103	MACHINE ID LABEL
104	PT21320104	PINCH/SHEAR HAZARD LABEL

REF	PART #	DESCRIPTION
105	PLABEL-11D	EYE INJURY HAZARD LABEL
106	P417B530	GRIZZLY DOMED LABEL
107	PPAINT-1	GRIZZLY GREEN TOUCH-UP PAINT

⚠WARNING

Safety labels warn about machine hazards and ways to prevent injury. The owner of this machine MUST maintain the original location and readability of the labels on the machine. If any label is removed or becomes unreadable, REPLACE that label before using the machine again. Contact Grizzly at (800) 523-4777 or www.grizzly.com to order new labels.

Grizzly Industrial, Inc. WARRANTY CARD

Name _____

Street _____

City _____ State _____ Zip _____

Phone # _____ Email _____

Model # _____ Order # _____ Serial # _____

The following information is given on a voluntary basis. It will be used for marketing purposes to help us develop better products and services. ***Of course, all information is strictly confidential.***

1. How did you learn about us?

____ Advertisement ____ Friend ____ Catalog
____ Card Deck ____ Website ____ Other:

2. Which of the following magazines do you subscribe to?

____ Cabinetmaker & FDM
____ Family Handyman
____ Hand Loader
____ Handy
____ Home Shop Machinist
____ Journal of Light Cont.
____ Live Steam
____ Model Airplane News
____ Old House Journal
____ Popular Mechanics
____ Popular Science
____ Popular Woodworking
____ Precision Shooter
____ Projects in Metal
____ RC Modeler
____ Rifle
____ Shop Notes
____ Shotgun News
____ Today's Homeowner
____ Wood
____ Wooden Boat
____ Woodshop News
____ Woodsmith
____ Woodwork
____ Woodworker West
____ Woodworker's Journal
____ Other:

3. What is your annual household income?

____ $20,000-$29,000 ____ $30,000-$39,000 ____ $40,000-$49,000
____ $50,000-$59,000 ____ $60,000-$69,000 ____ $70,000+

4. What is your age group?

____ 20-29 ____ 30-39 ____ 40-49
____ 50-59 ____ 60-69 ____ 70+

5. How long have you been a woodworker/metalworker?

____ 0-2 Years ____ 2-8 Years ____ 8-20 Years ____ 20+ Years

6. How many of your machines or tools are Grizzly?

____ 0-2 ____ 3-5 ____ 6-9 ____ 10+

7. Do you think your machine represents a good value? _____Yes _____No

8. Would you recommend Grizzly Industrial to a friend? _____Yes _____No

9. Would you allow us to use your name as a reference for Grizzly customers in your area?
Note: *We never use names more than 3 times.* _____Yes _____No

10. Comments: _____

_____

_____

_____

CUT ALONG DOTTED LINE

FOLD ALONG DOTTED LINE

Place
Stamp
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GRIZZLY INDUSTRIAL, INC.
P.O. BOX 2069
BELLINGHAM, WA 98227-2069

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Send a Grizzly Catalog to a friend:

Name_____

Street_____

City_____State_____Zip_____

TAPE ALONG EDGES--PLEASE DO NOT STAPLE

WARRANTY AND RETURNS

Grizzly Industrial, Inc. warrants every product it sells for a period of **1 year** to the original purchaser from the date of purchase. This warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence, accidents, repairs or alterations or lack of maintenance. This is Grizzly's sole written warranty and any and all warranties that may be implied by law, including any merchantability or fitness, for any particular purpose, are hereby limited to the duration of this written warranty. We do not warrant or represent that the merchandise complies with the provisions of any law or acts unless the manufacturer so warrants. In no event shall Grizzly's liability under this warranty exceed the purchase price paid for the product and any legal actions brought against Grizzly shall be tried in the State of Washington, County of Whatcom.

We shall in no event be liable for death, injuries to persons or property or for incidental, contingent, special, or consequential damages arising from the use of our products.

To take advantage of this warranty, contact us by mail or phone and give us all the details. We will then issue you a "Return Number,'' which must be clearly posted on the outside as well as the inside of the carton. We will not accept any item back without this number. Proof of purchase must accompany the merchandise.

The manufacturers reserve the right to change specifications at any time because they constantly strive to achieve better quality equipment. We make every effort to ensure that our products meet high quality and durability standards and we hope you never need to use this warranty.

Please feel free to write or call us if you have any questions about the machine or the manual.

Thank you again for your business and continued support. We hope to serve you again soon.