

CS118 Chain Grinder User Manual

Thank you for your purchase of a T & S Manufacturing, LLC CS118 chain grinder. We are a family owned business located in Klamath Falls, Oregon. One of our goals is to build a high quality machine that would last. It is our hope that you will be able to use this grinder for many years to come. If we can be of any assistance with questions, troubleshooting, or anything else, please feel free to contact us. The last page of this manual has our contact information listed.

Sincerely, *The Terrell Family*

SAFETY



- Please take time to familiarize yourself with the grinder and its operation. When servicing the machine please disconnect the power. It is suggested to use lock-out-tag-out procedures to prevent the machine being turned on during servicing.
- Do not operate machine with cover removed.
- Inspect and test each new stone you intend to install. The “ring test” can help ensure a grinding stone is not cracked. A screwdriver or other tool can be inserted through the center of the grinding stone, and suspended. Tapping on the stone gently with another tool should produce a “ring”. If the tone is dull, this may indicate a cracked or damaged grinding stone. Do not use a cracked or damaged grinding stone.
- An additional safety procedure that may be used after installing a new grinding stone, is to turn the control power to 10%. The motor can be slowly increased in speed.



PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Safety glasses should be worn at all times while operating the machine, or performing maintenance. Sparks, debris, metal, or stone pieces may be projected from the machine.
- To protect your hands, it is recommended to use gloves while operating the machine. Chain can become extremely sharp after and during grinding.

FIRE

- While sharpening chain, sparks and hot metal can be projected from the machine. To prevent a possible fire, ensure that the sparks will not hit any flammable or combustible materials.

STORAGE

- While the CS118 grinder can be used at a worksite, it is not suitable for outdoor storage. Ensure the grinder is covered or stored indoors and out of rain, snow, and dust.

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GRINDER STAND SETUP

The grinder stand comes in the folded-up configuration, like Figure 1. The bolts used to fasten the legs to the main body of the stand are left loose, allowing you to fold down the legs readily. To fix the legs into the correct position:

1.Swing one of the legs down until it aligns with the slots.

2.Push the leg up, into the slot.

3.Tighten the $\frac{1}{4}$ -20 bolts to secure the leg.

4.Repeat this procedure for each leg.

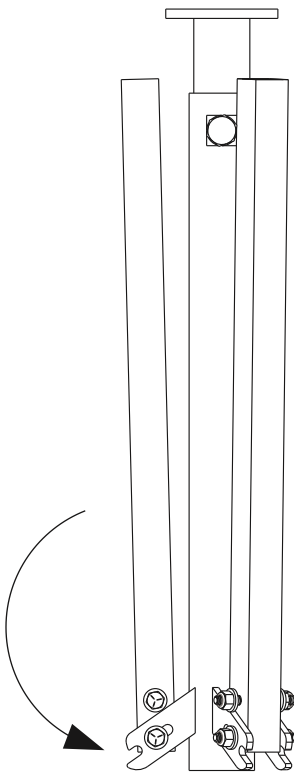


Figure 1
Rotate leg into Alignment

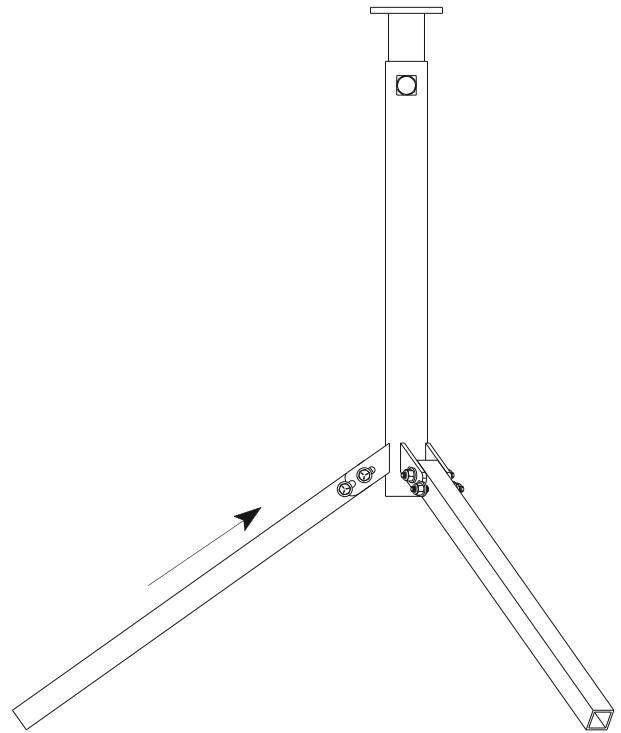


Figure 2
Push leg bolt up into slot, and tighten bolts

GRINDER INSTALLATION

Each grinder comes with a 1/2-13 x 1" hex bolt. This can be used to mount to the stand or a bench.

The final height of the grinder can be adjusted by sliding the inner support tube upwards and then tightening the set bolt. You may wish to set the approximate height of the stand before placing the grinder in position.

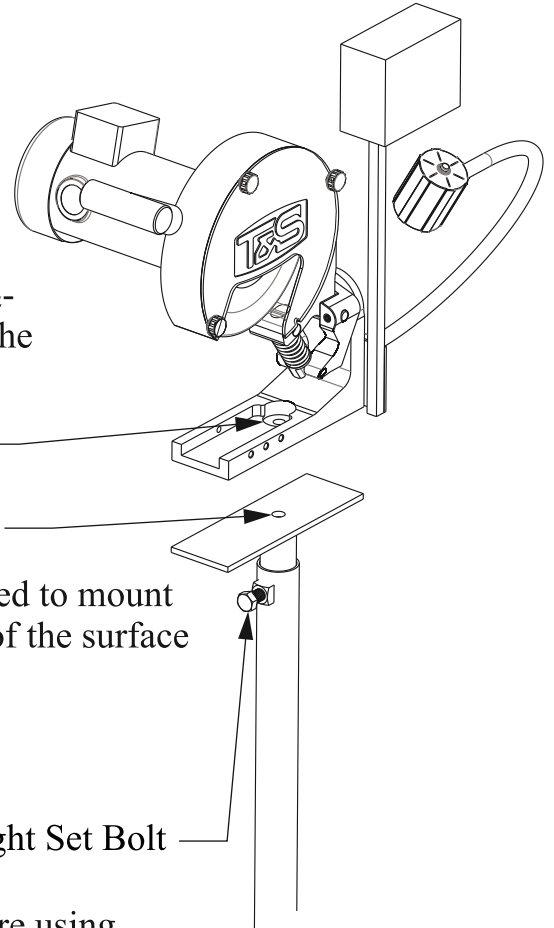
MOUNTING TO STAND

1. The CS118 grinder can now be placed on top of the stand.
2. Align the through hole in the grinder base with the threaded hole in the stand.
3. Align the sides of the grinder with the stand. The #1/2-13 bolt included with the grinder can be used to bolt the grinder to the stand.

Through Hole

Tapped #1/2-13 Hole

Stand Height Set Bolt

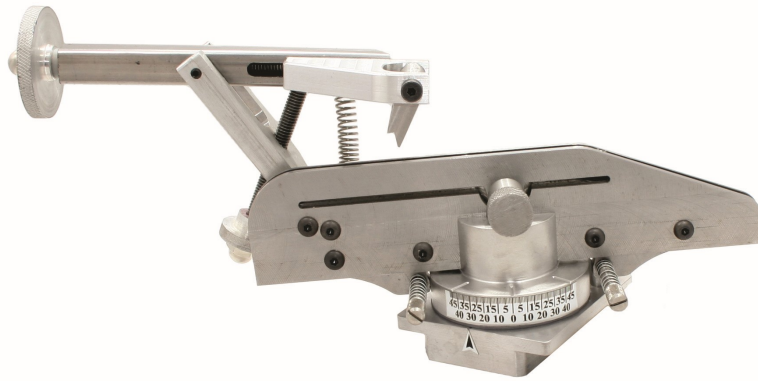


BENCH MOUNTED

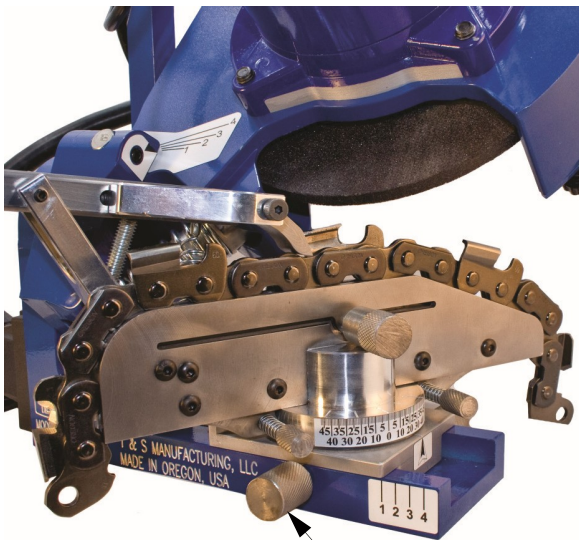
1. The through hole in the base of the grinder can be used to mount the grinder to a bench. Depending on the thickness of the surface you are mounting to you may need a longer bolt. Below is a list of needed mounting hardware:
 - 1 #1/2"-13 Bolt
 - 1 #1/2"-13 Nut
 - 1 #1/2" Washer
2. Drill a 9/16" hole in the bench or other surface you are using to mount the grinder.
3. Place the Grinder on the bench and align the mounting hole on the grinder with the drilled hole in the bench.
4. The 1/2-13 bolt should pass through both holes.
5. On the underside of the bench place a 1/2" washer over the bolt and then use the 1/2-13 nut to tighten the grinder to the bench.

CHAIN RAIL INSTALLATION

The CS118 grinder is easy to assemble. The chain rail assembly is separate from the grinder. Once the grinder is mounted on a stand or bench, the chain rail assembly can be removed from the packaging. The chain rail assembly slides into the grinder base. The left side of the grinder has 1 knob for locking the position of the chain rail assembly. The right side of the grinder has 2 knobs for locking.



Chain Rail Assembly



Locking Knob



Locking Knobs

Once the chain rail assembly is slid into the base of the machine, please tighten all three locking knobs. This will prevent the chain rail assembly from moving during sharpening.

Power, Motor Speed & Direction Controls

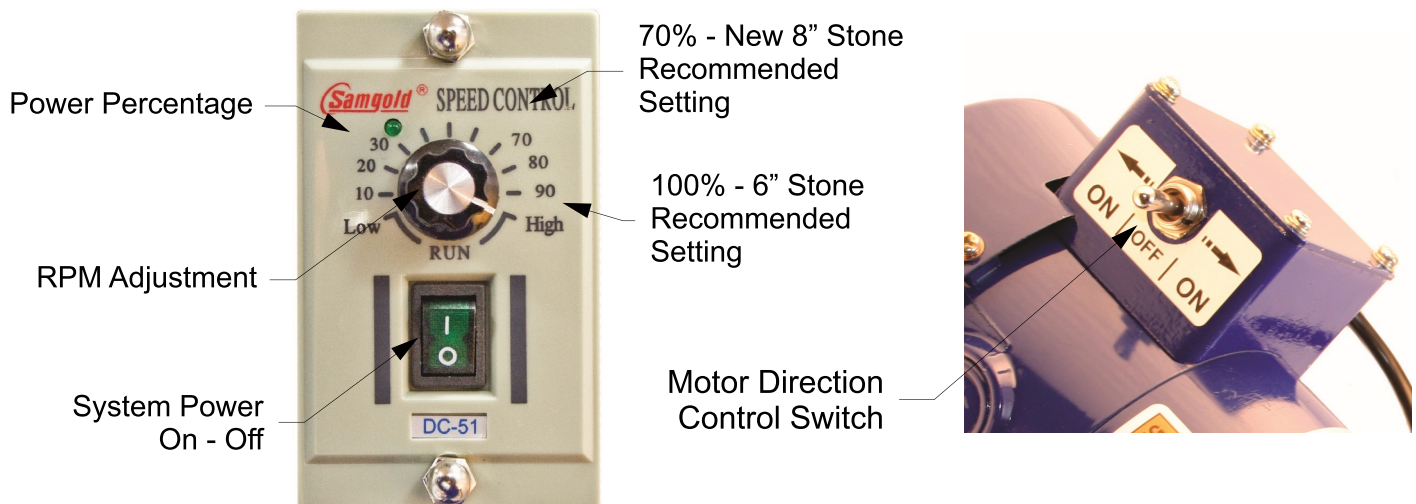
The machine power is controlled by the System Power switch. When this switch is turned on, power is turned on to the control and motor. The motor and light each have an additional switch, so they may be switched off separate of the control. When the machine is plugged in, the LED light always has power. The green button on top of the LED light switches the light on and off.

The motor direction is controlled by the switch on the motor itself. The switch has 3 positions allowing for Clockwise - Off - Counterclockwise operation.

A unique feature of this grinder is the ability to control the RPM (revolutions per minute) of the DC motor. The purpose of this feature is to allow the grinding speed of the stone to remain constant as the stone becomes smaller. As a grinding stone diameter becomes smaller, the circumference, or distance around the outside of the stone, also becomes smaller. This has the effect of reducing the amount of grinding that can happen in each revolution of the stone. Increasing the RPM of the stone effectively cancels this out and maintains your productivity. Below is a chart showing the recommended RPM and percentage of power on the control to achieve this.

| Alignment Position | Stone Diameter | Approximate Power % | RPM |
|--------------------|----------------|---------------------|------|
| 1 | 8" | 70 | 1750 |
| 1-1/2 | 7-3/4" | 75 | 1810 |
| 2 | 7-1/2" | 80 | 1865 |
| 2-1/2 | 7-1/4" | 83 | 1931 |
| 3 | 7" | 86 | 2000 |
| 3-1/4 | 6-3/4" | 89 | 2075 |
| 3-1/2 | 6-1/2" | 92 | 2150 |
| 3-3/4 | 6-1/4" | 96 | 2240 |
| 4 | 6" | 100 | 2333 |

Please note, the Alignment Position is an approximate guide. The fractional positions are not shown on the side of the machine, so an estimate can be used. This chart is intended to show the relationship between the grinding stone diameter and the RPM.

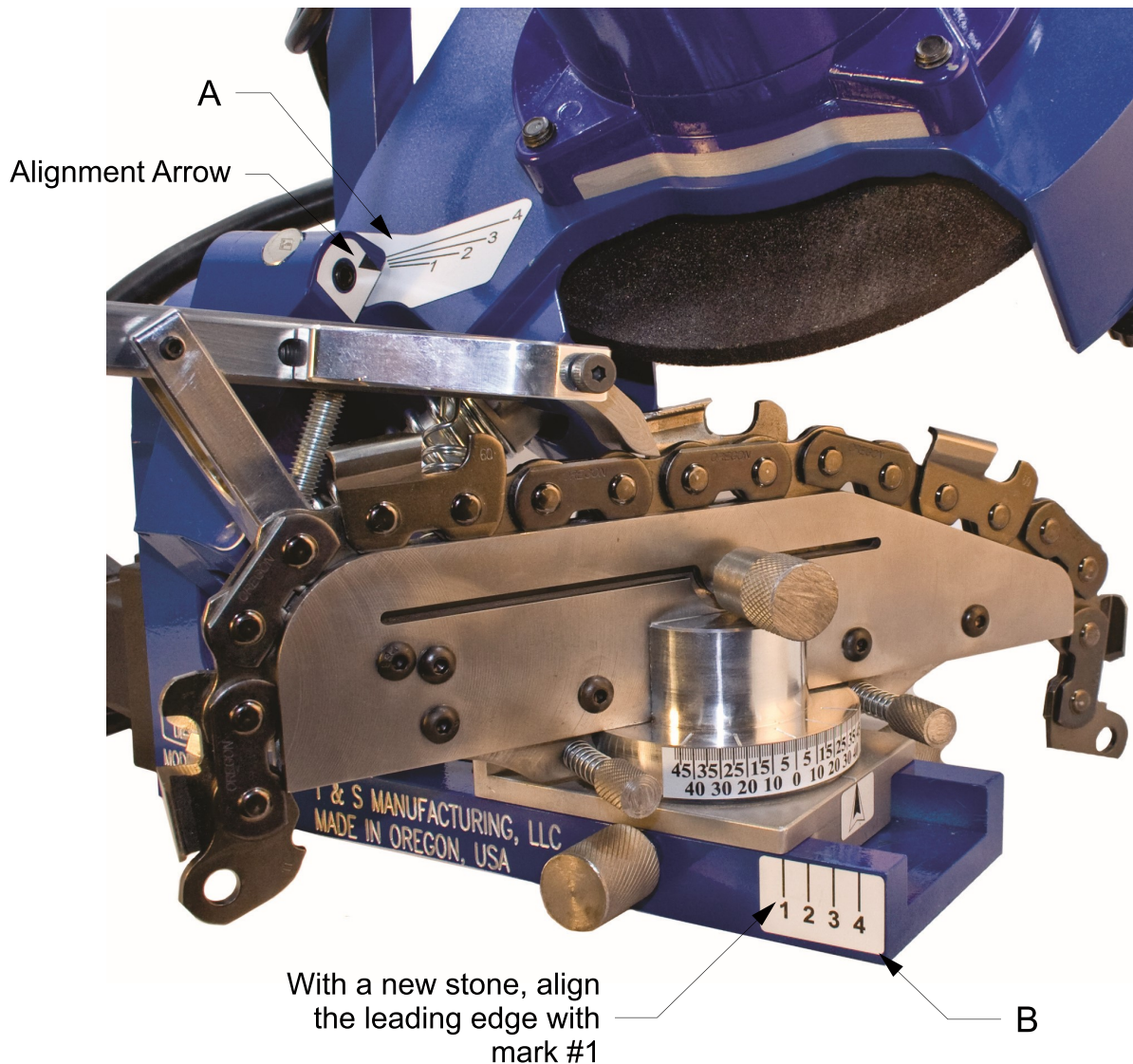


Grinding Stone Center Alignment

To keep the grinding stone centered when grinding chain, the CS118 grinder has reference marks on the cutting head (A) and the machine base (B). These marks are to be used together in establishing the centerline of the grinding stone.

With a new 8" grinding stone, the leading edge of the chain rail assembly base should be in-line with mark #1.

As the cutting head is lowered to begin grinding, the line for 1 will align with the arrow to the left of the line. In this way, the 1 on the cutting head will correspond with the 1 on the machine base. As the grinding stone wears, line 2 will line up with the alignment arrow. At this time the chain rail assembly should be slid forward to mark 2. This will progress until the stone is worn to about a 6" diameter.

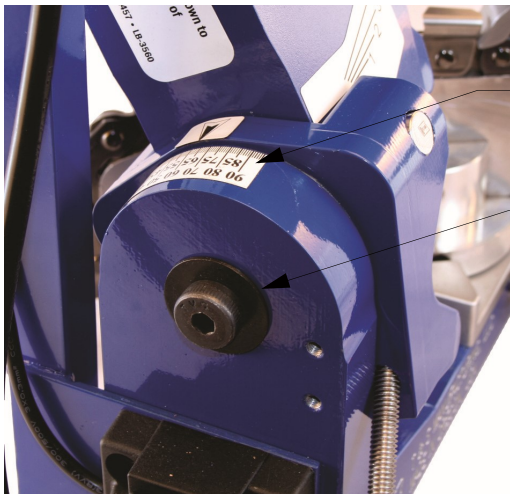


Setting the Head Grinding Angle



When loosening the bolt to rotate the cutting head, the motor must be supported. Failure to do so may cause the head to swing downward quickly and cause machine damage.

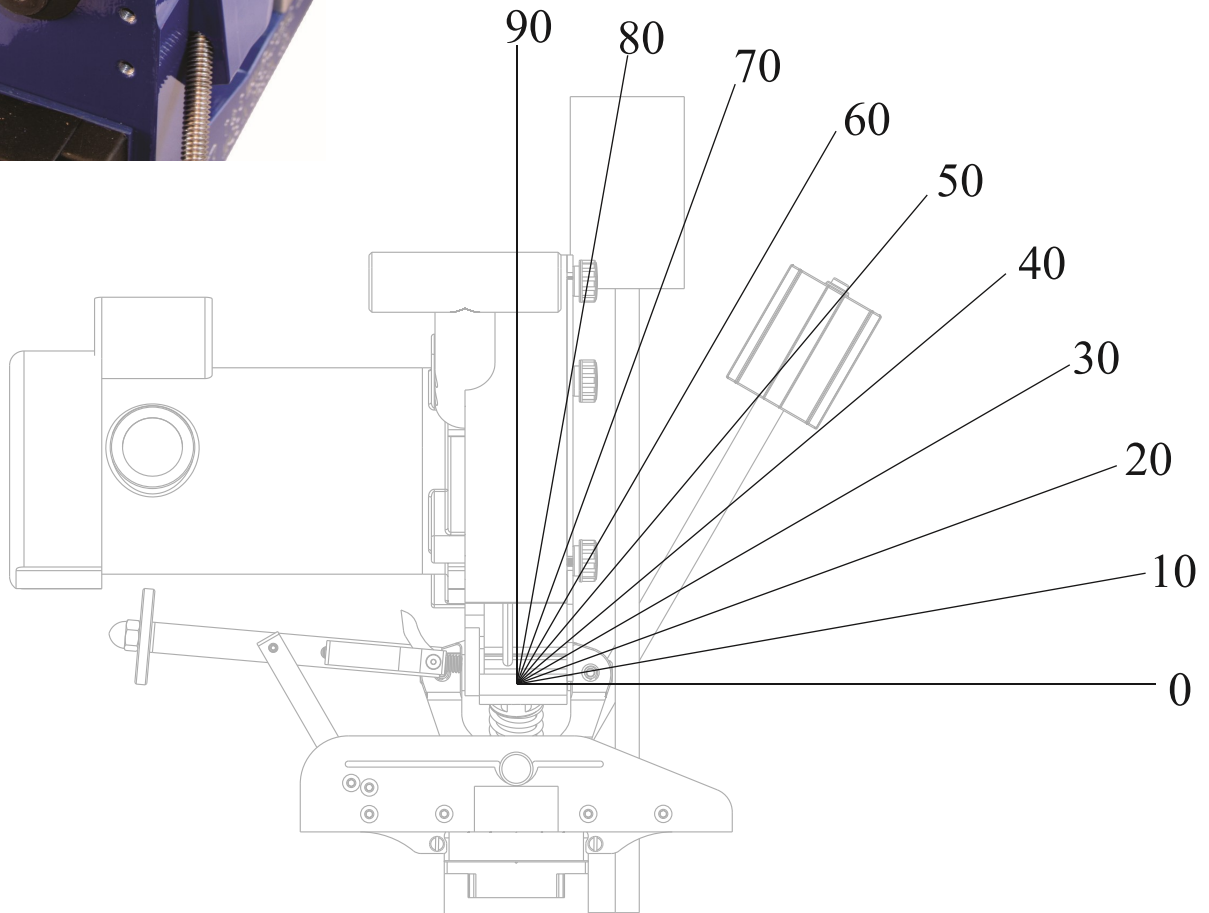
The grinding angle of the machine can be set by loosening the shoulder bolt on the back of the machine base. Please ensure the grinder is supported before loosening the shoulder bolt. It may be convenient to cradle the motor with one arm and loosen the shoulder bolt with your opposite hand. Once the shoulder bolt is loose, the cutting head can be rotated to the top angle specified by your chain manufacturer.



Angle Readout

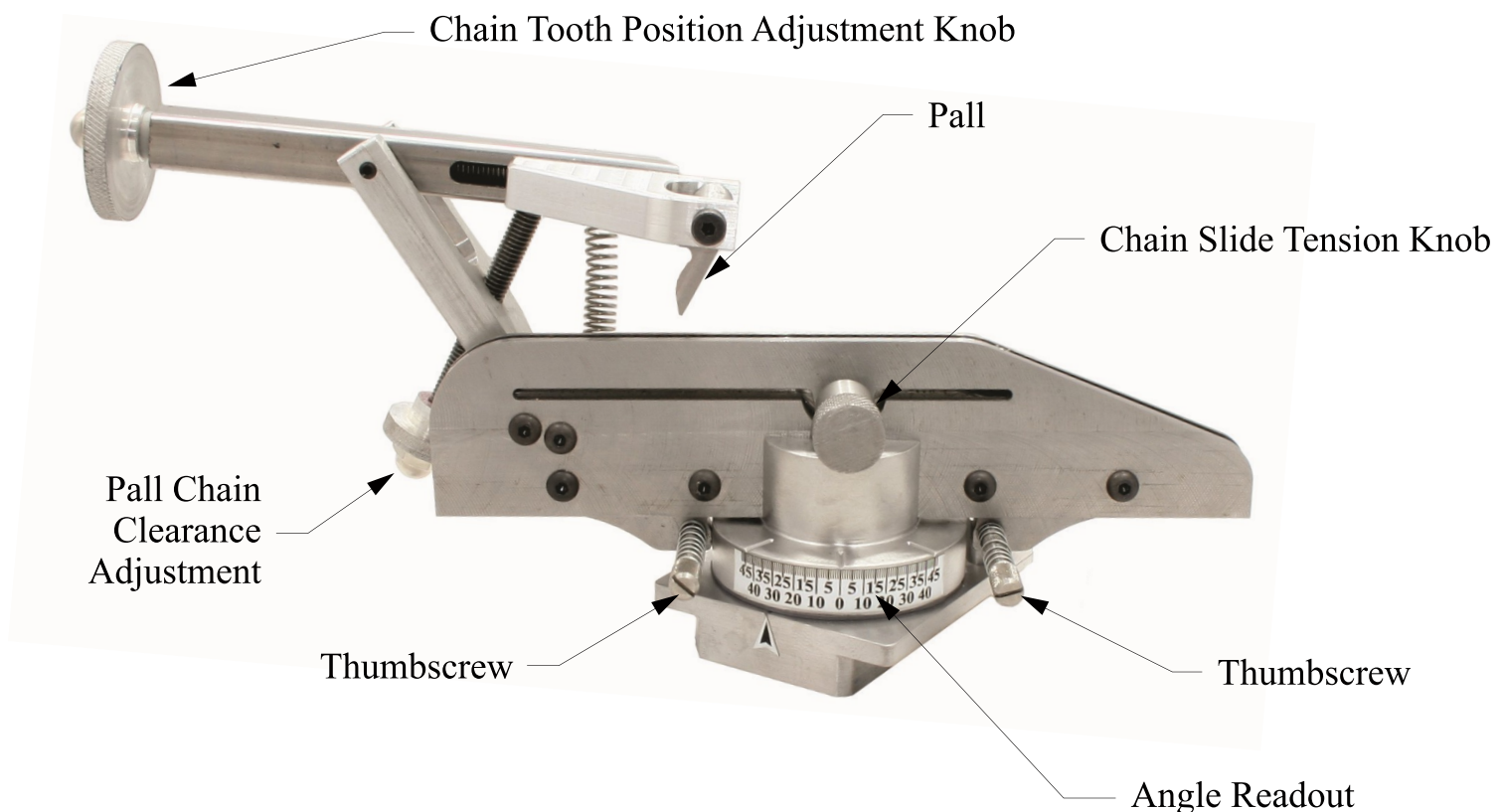
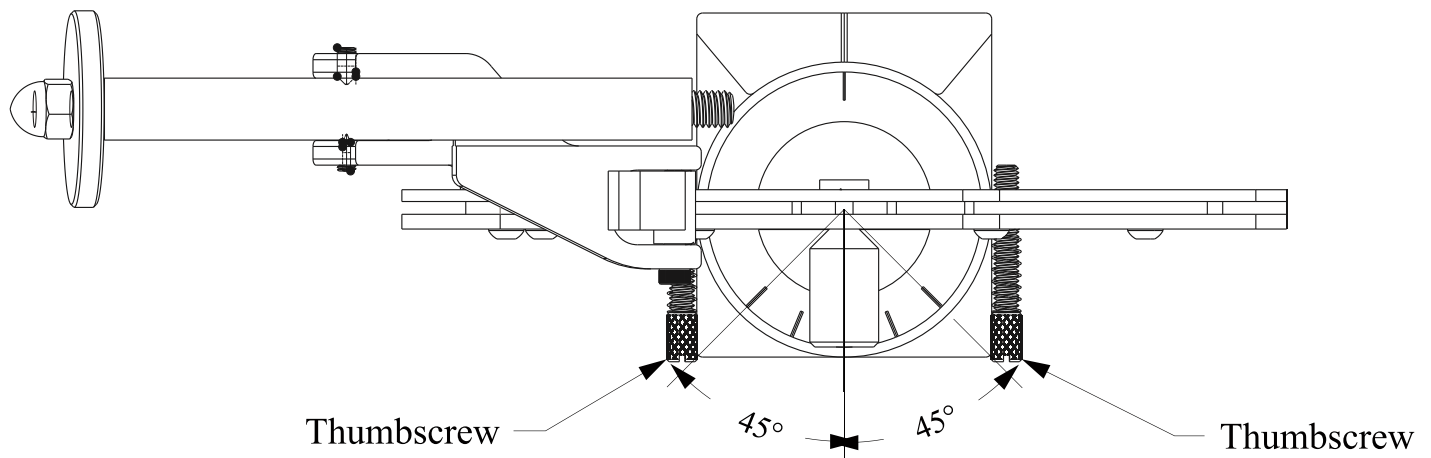
Shoulder Bolt

The cutting angle of the head is registered at 90 degrees in the vertical position and 0 degrees in the horizontal position. The figure below indicates the orientation of grinding angles in relation to the chain.



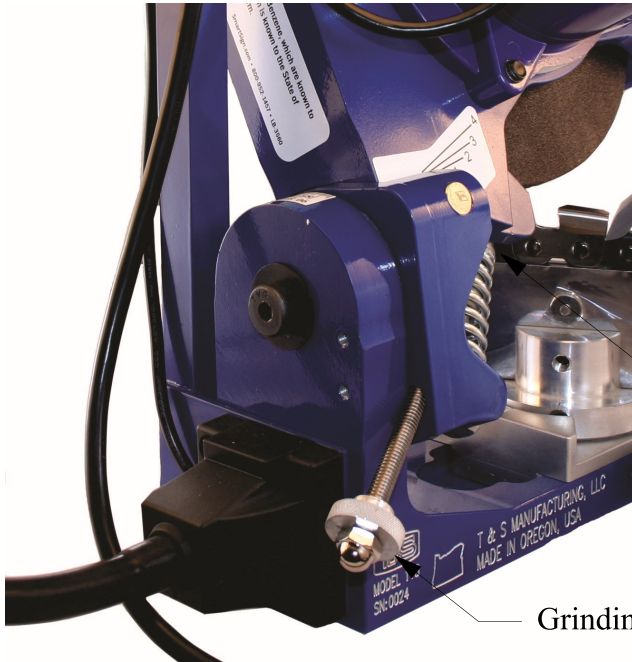
Setting the Sharpening Angles

The chain rail assembly angle can be set by rotating the chain rail assembly clockwise or counterclockwise. The rotation angle can be up to 40 degrees in either direction. The reference marks engraved in the base are at 22.5 degrees and 45 degrees. These are used to register the label and ensure accurate placement incase the label ever needs replacing. Two thumbscrews are positioned on the each side of the chain rail base. Adjusting these thumbscrews in and out, will increase or decrease the stopping angle of the chain rail.



Grinding Depth and Chain Installation

The depth of the grinding stone into the chain tooth can be set by adjustment of the depth stop. This stop is located on the lower left side of the cutting head. It is optional to use this feature.



The Grinding Depth Stop contacts this area of the cutting head, limiting the grinding depth

Grinding Depth Stop

Chain Installation

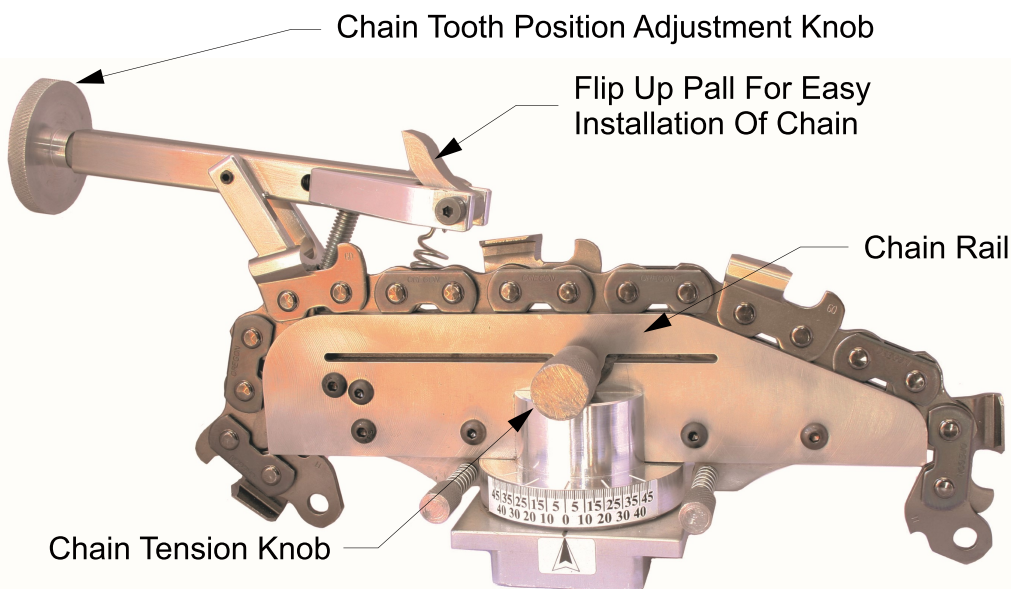
To install the chain the rail for grinding, flip the pall up and away from the rail, as seen below. If the bottom of the pall is getting in the way of the chain, the adjustment knob on the back of the chain rail assembly can be used to elevate the pall yoke. It is easiest to use one hand to pull up on the pall and yoke while turning the knob clockwise with your other hand.

How freely the chain slides can be adjusted by the chain tension knob. As the knob is tightened, the chain rail pinches the chain drivers.



To keep the chain sliding freely, it is recommended to use a small brush and/or vacuum to clean the chain rail out. A small paintbrush turned sideways can get into the rail gap.

To make cleaning easy, the whole chain rail assembly can be removed by loosening the knobs on the sides of the machine base.

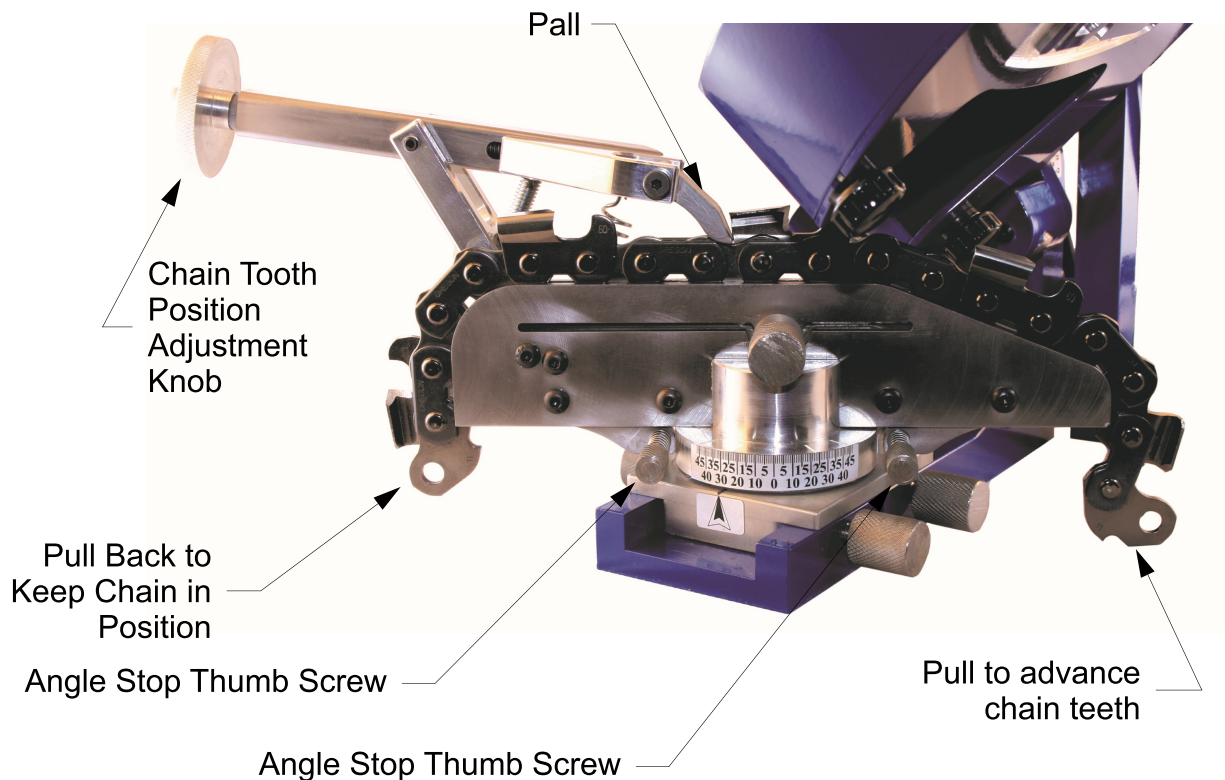


Positioning the Pall and Grinding

After the chain is placed into the chain rail, the pall can be dropped behind the tooth. The pall is designed to push down right behind the tooth and on top of the chain link. Depending on the length of the tooth, the pall assembly can push the chain forward or backwards. Turning the pall adjustment knob clockwise will draw the pall back. Turning the knob counterclockwise will move the chain forward and into the grinding stone.

Once the cutting angles have been set, the chain can be sharpened. Pulling on the chain with your left hand will lock the chain into position against the pall. Your right hand can then pull the machine head down into the tooth. Once the tooth is ground the chain can be pulled forward with your right hand. The pall should allow the chain teeth to slide underneath.

The entire chain rail assembly pivots left and right for grinding the corresponding tooth direction. The thumb screws can be adjusted to provide the proper stopping angle.



New Stone Installation

The CS118 grinder is designed to allow the stone to be worn down to about 6" diameter. At this point the stone will need to be replaced. Each machine comes with a new 8" x 1" x 5/16" stone. To shape this new stone, please skip ahead to the next page. To install a new stone please follow the guidelines below:



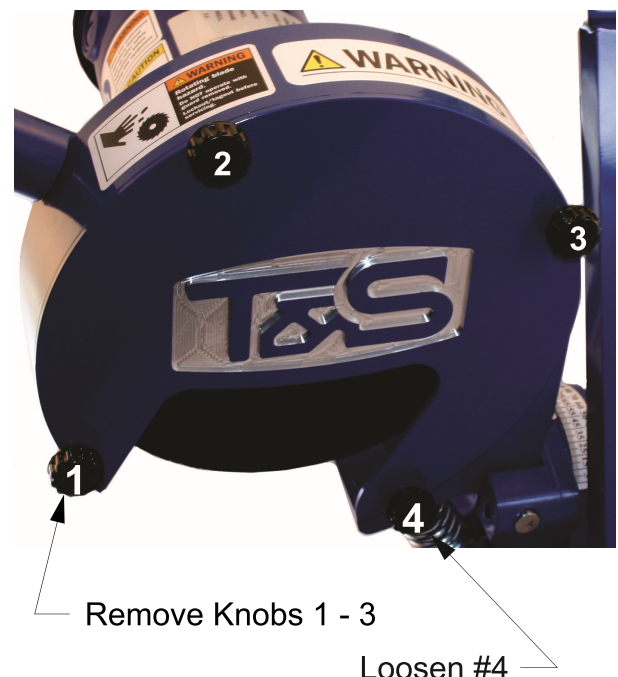
For safety, please test and inspect each new stone before installation and follow these guidelines.

- While you may not often receive a cracked grinding stone, it can happen.
- First please hold the stone up to the light to see any possible defects.
- The “ring test” can help determine if a grinding stone is cracked. Suspend the grinding stone using your finger a screwdriver or other tool through the center mounting hole. Tapping on the stone gently with another tool should produce a “ring”. If the tone is dull, this may indicate a cracked or damaged grinding stone.
- Do not use a cracked or damaged grinding stone.
- An additional safety procedure that may be used after installing a new grinding stone, is to turn the control power to 10%. The motor can be slowly increased in speed.
- The nut for retaining the grinding stone does not need to be extremely tight. Please do not over tighten, as this may crack the stone.
- After installation, set the motor direction to rotate away from you.

Stone Installation:

Each grinder includes a nut wrench and a shaft wrench. See the following page. Often the nut can be removed while using the nut wrench and holding the stone with your other hand. Please ensure the power to the machine has been disconnected.

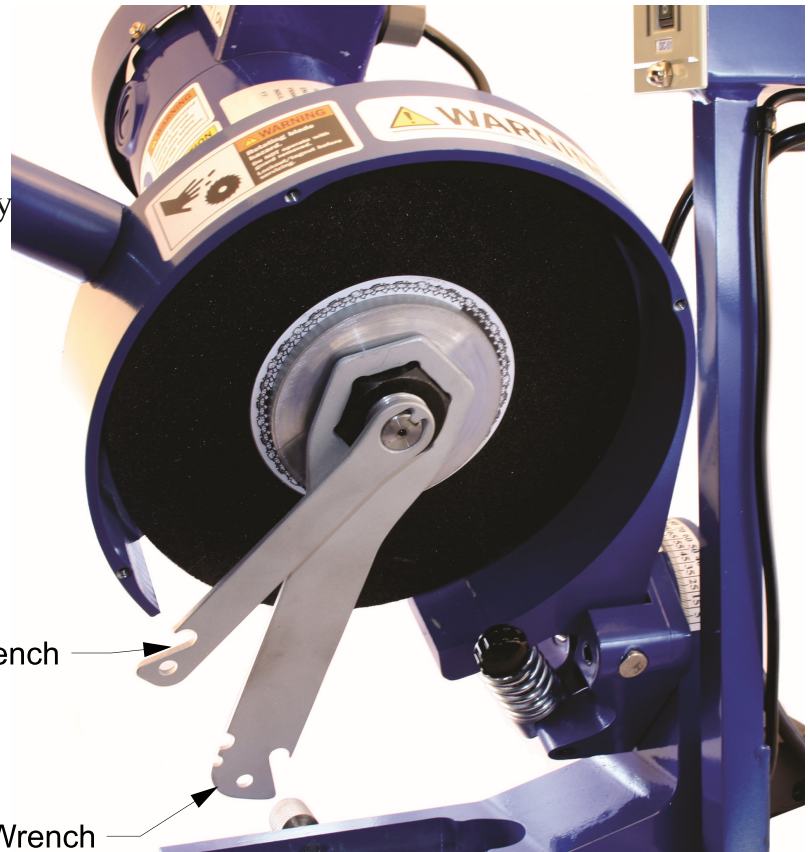
- The grinding stone cover will need to be removed first. Only 3 thumb screws will need to be removed. The 4th thumb screw only needs to be loosened. Remove thumbscrews 1 through 3.
- The nut for the retaining the grinding stone is a standard righthand thread, and rotates counterclockwise for removal. Remove the nut and the grinding stone retaining support disc.
- The grinding stone can be slid off the arbor.
- Install the new stone by sliding it over the arbor. The fit may be tight, but should allow the stone to slide onto the arbor.



New Stone Installation

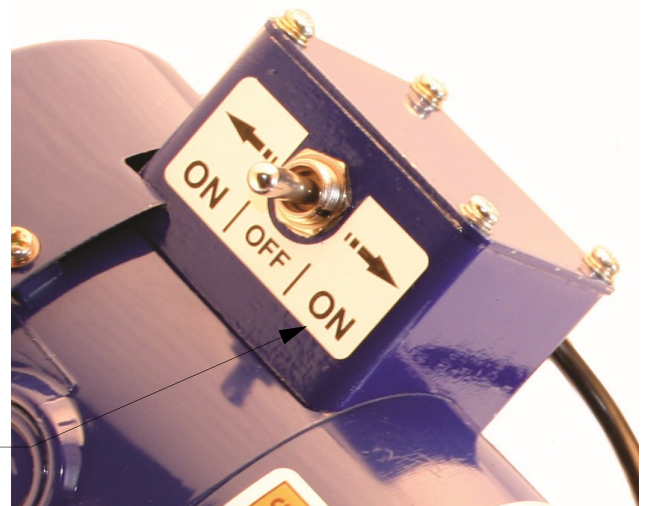
Stone Installation Continued:

- Replace the support and nut.
- The retaining nut does not need to be very tight. Often the grinding wheel can be held in place with your left hand and nut gently tightened using the wrench.
- For safety please replace the grinding wheel cover.
- When turning on the grinder after installing a new stone, Set the motor direction to be away from you.
- The power should be turned down first to between 10% and 30%. If a stone breaks will greatly slow any pieces being projected from grinder.
- The motor speed can be increased to 70%. This will set the new stone to approximately 1750 RPM



Shaft Wrench

Nut Wrench



Motor Direction Control Switch

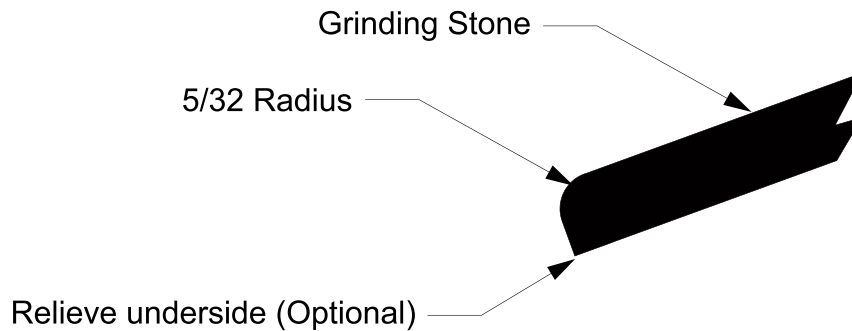
Setting the switch downward will rotate the stone away from the operator

Stone Shaping

The CS118 grinder comes with a new stone and shaping stones. The stone has not been shaped for the radius required for sharpening. A radius will need to be formed by the operator on the top side of the wheel, as shown in the illustration below.

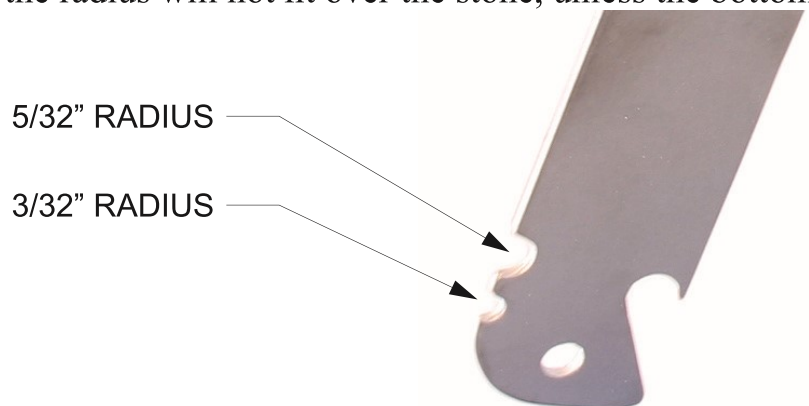
The stone will also need to be touched up or shaped again after use. Grinding stones will wear down with use.

A full radius is not required, though you can choose to relieve the underside.

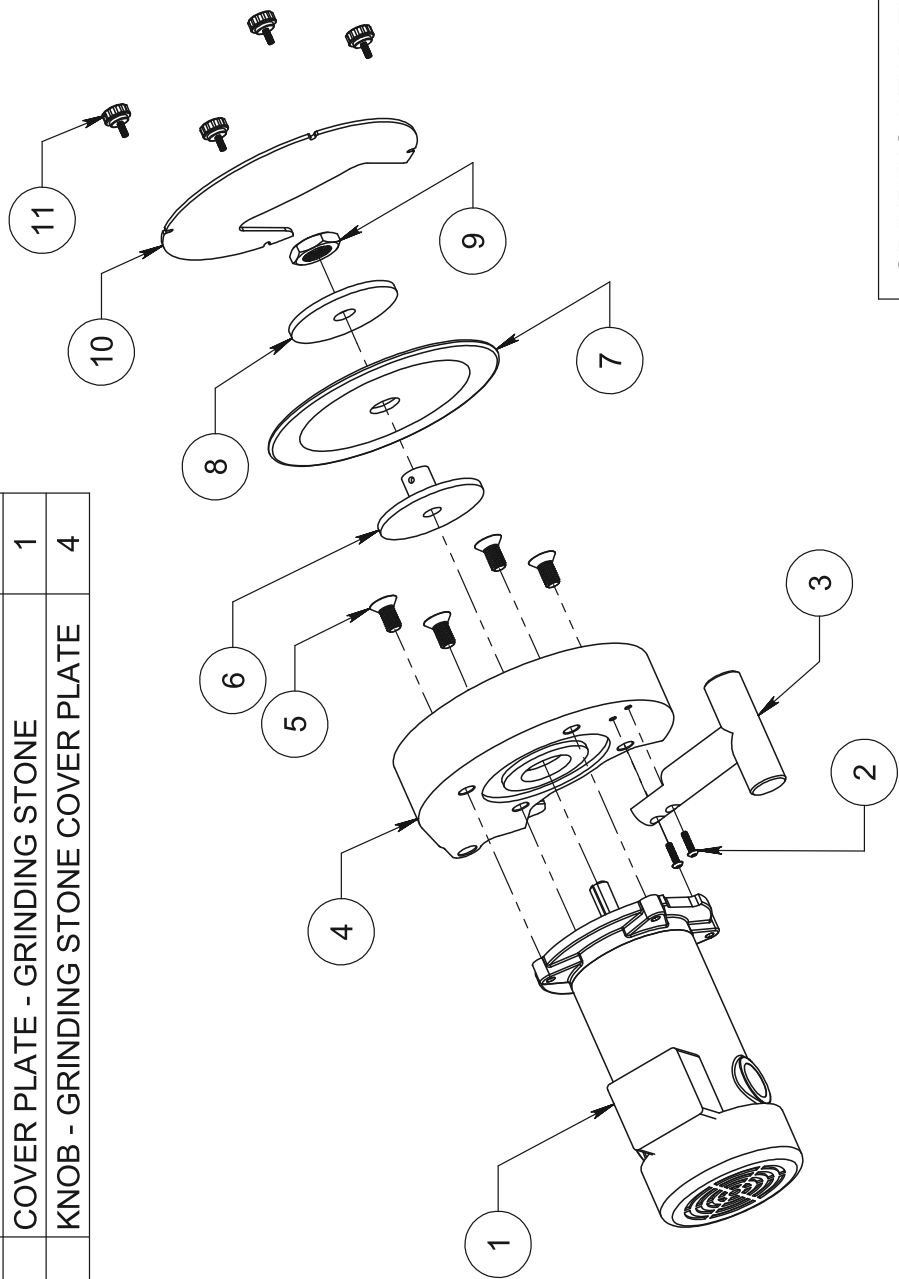


To shape the grinding stone:

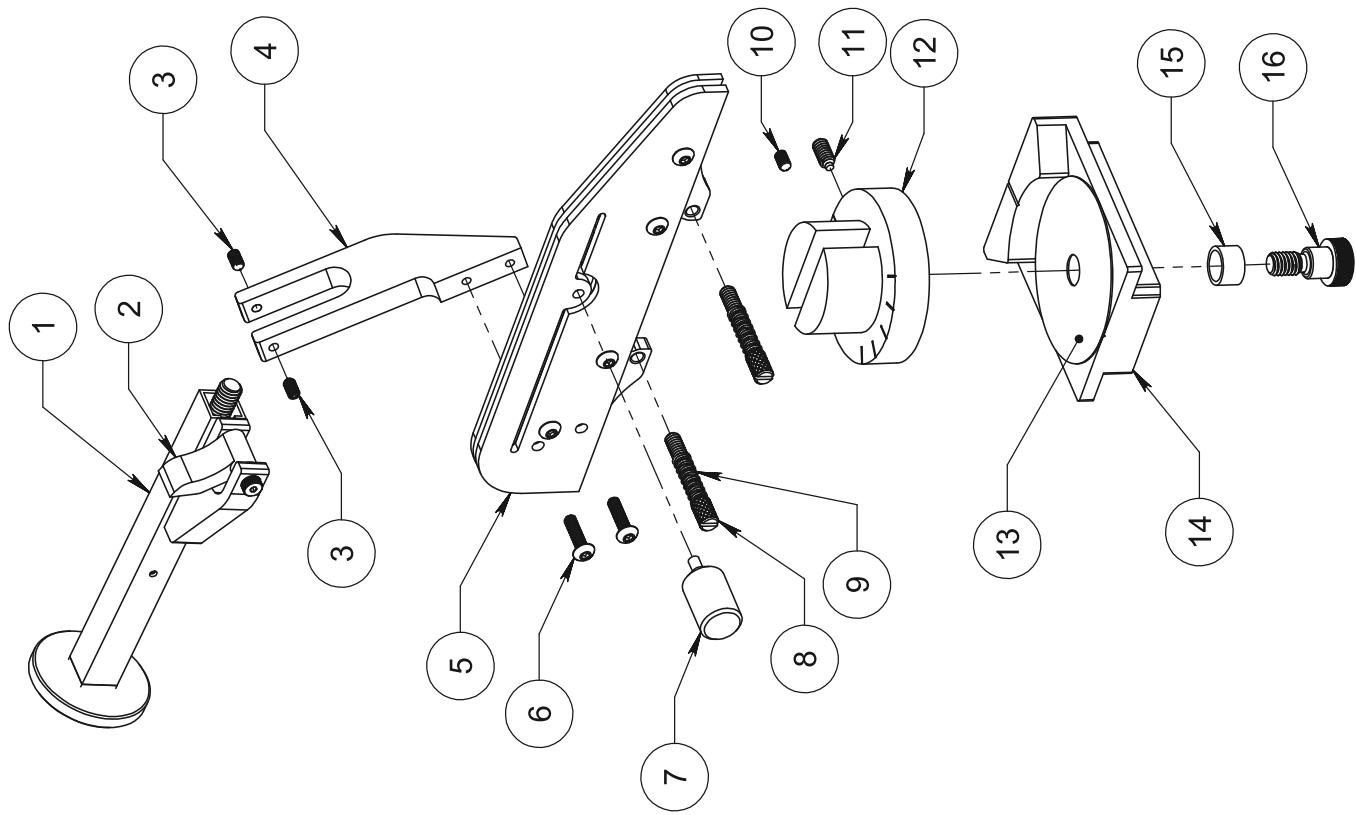
- Turn the grinder on with the rotation away from you. This will help keep dust from being thrown in your direction.
- Use one of the included shaping bricks to grind against the stone in order to produce a 5/32" radius on the top edge of the stone. This radius should match the radius you wish to achieve on the cutting edge of the chain tooth.
- The nut wrench included with the CS118 grinder has two radii machined into the side of it. The larger radius is 5/32" and the smaller radius is 3/32". These can be used as a guide when shaping a stone. Please note the radius will not fit over the stone, unless the bottom edge is shaped or relieved.
- The 5/32" radius is used for stones with a thickness of 5/16".
- The 3/32" radius is used for stones with a thickness of 3/16".



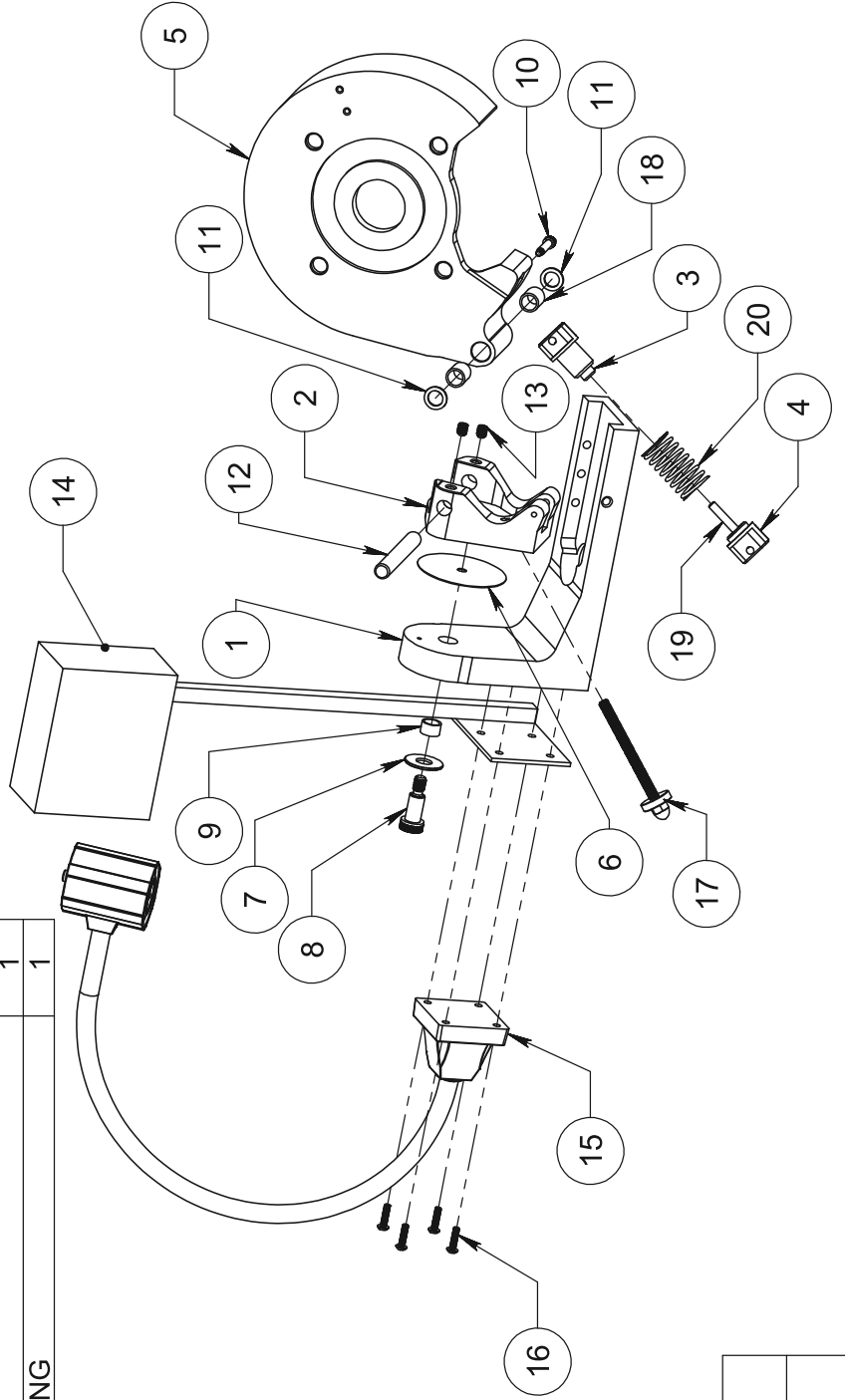
| NO. | PART # | DESCRIPTION | QTY |
|-----|----------|--------------------------------------|-----|
| 1 | P9001 | 1/2 HP DC MOTOR | 1 |
| 2 | P9039 | #10-32 x 3/4" Pan HCS Block Oxide | 2 |
| 3 | CS118-8 | PULL HANDLE | 1 |
| 4 | CS118-2 | GRINDER HEAD | 1 |
| 5 | P9040 | #3/8-16 FLAT HEAD SCS | 4 |
| 6 | CS118-7 | MOUNTING ARBOR - GRINDING STONE | 1 |
| 7 | P9002 | 8" x 1" x 5/16" BLACK GRINDING STONE | 1 |
| 8 | CS118-16 | SUPPORT DISC - GRINDING STONE | 1 |
| 9 | P9041 | RETENTION NUT - GRINDING STONE | 1 |
| 10 | CS118-4 | COVER PLATE - GRINDING STONE | 1 |
| 11 | P9042 | KNOB - GRINDING STONE COVER PLATE | 4 |



| NO. | PART # | DESCRIPTION | QTY |
|-----|----------|------------------------------------|-----|
| 1 | CS118-40 | PALL ADJUSTMENT ASSEMBLY | 1 |
| 2 | CS118-20 | CHAIN PALL | 1 |
| 3 | P9046 | #10-32 SET SCREW | 2 |
| 4 | CS118-12 | FORK - PALL ADJUSTMENT | 1 |
| 5 | SC118-45 | CHAIN RAIL - 3/4 PITCH CHAIN | 1 |
| 6 | P9044 | #10-32 X 1" PAN SHCS | 2 |
| 7 | CS118-32 | RAIL CLAMP ADJUSTMENT KNOB | 1 |
| 8 | CS118-33 | THUMBSCREW - RAIL ANGLE ADJUSTMENT | 2 |
| 9 | P9045 | THUMBSCREW SPRING | 2 |
| 10 | P9046 | #10-32 SET SCREW - CHAIN RAIL | 1 |
| 11 | P9047 | #5/16-18 BRASS TIP SET SCREW | 1 |
| 12 | CS118-5 | RAIL PIVOT | 1 |
| 13 | CS118-19 | PIVOT DISC | 1 |
| 14 | CS118-6 | SLIDE BLOCK | 1 |
| 15 | P9008 | 1/2" x 3/8" BRONZE BUSHING | 1 |
| 16 | P9020 | 1/2" Dia x 3/8 SHOULDER BOLT | 1 |



| NO. | PART # | DESCRIPTION | QTY. |
|-----|----------|-----------------------------------|------|
| 1 | P9001 | MACHINE BASE | 1 |
| 2 | CS118-3 | HEAD YOKE | 1 |
| 3 | CS118-13 | STRUT - UPPER | 1 |
| 4 | CS118-14 | STRUT - LOWER | 1 |
| 5 | CS118-2 | GRINDER HEAD | 1 |
| 6 | CS118-19 | PIVOT DISC | 1 |
| 7 | P9006 | 1/2" FLAT BLACK WASHER | 1 |
| 8 | P9007 | 1/2" x 7/8" SHOULDER BOLT | 1 |
| 9 | P9008 | 1/1/2" x 3/8" BRONZE BUSHING | 1 |
| 10 | P9005 | 1/4" X 1" SHCS SHOULDER BOLT | 2 |
| 11 | P9004 | NYLON WASHER | 2 |
| 12 | P9009 | 1/2" X 4" PRECISION ROD | 1 |
| 13 | P9032 | #5/16-18 SET SCREW | 2 |
| 14 | P9045 | DC CONTROL BOX AND STAND | 1 |
| 15 | P9026 | LED FLEX LIGHT | 1 |
| 16 | P9039 | #10-32 x 3/4" PAN HCS | 4 |
| 17 | P9044 | GRINDING DEPTH STOP ASSEMBLY | 1 |
| 18 | P9043 | 1/2" x 5/8" x 3/4" BRONZE BUSHING | 2 |
| 19 | CS118-18 | STRUT PIN | 1 |
| 20 | P9003 | STRUT SPRING | 1 |



BASE EXPLODED VIEW

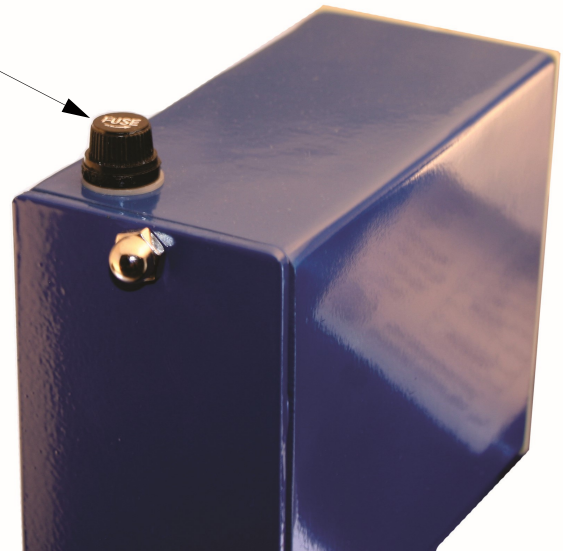
T & S MANUFACTURING, LLC

Maintenance

Fuse Replacement

If the control will not power up, you can check the fuse. The fuse is located on top of the speed control housing.

Fuse



Contacts

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