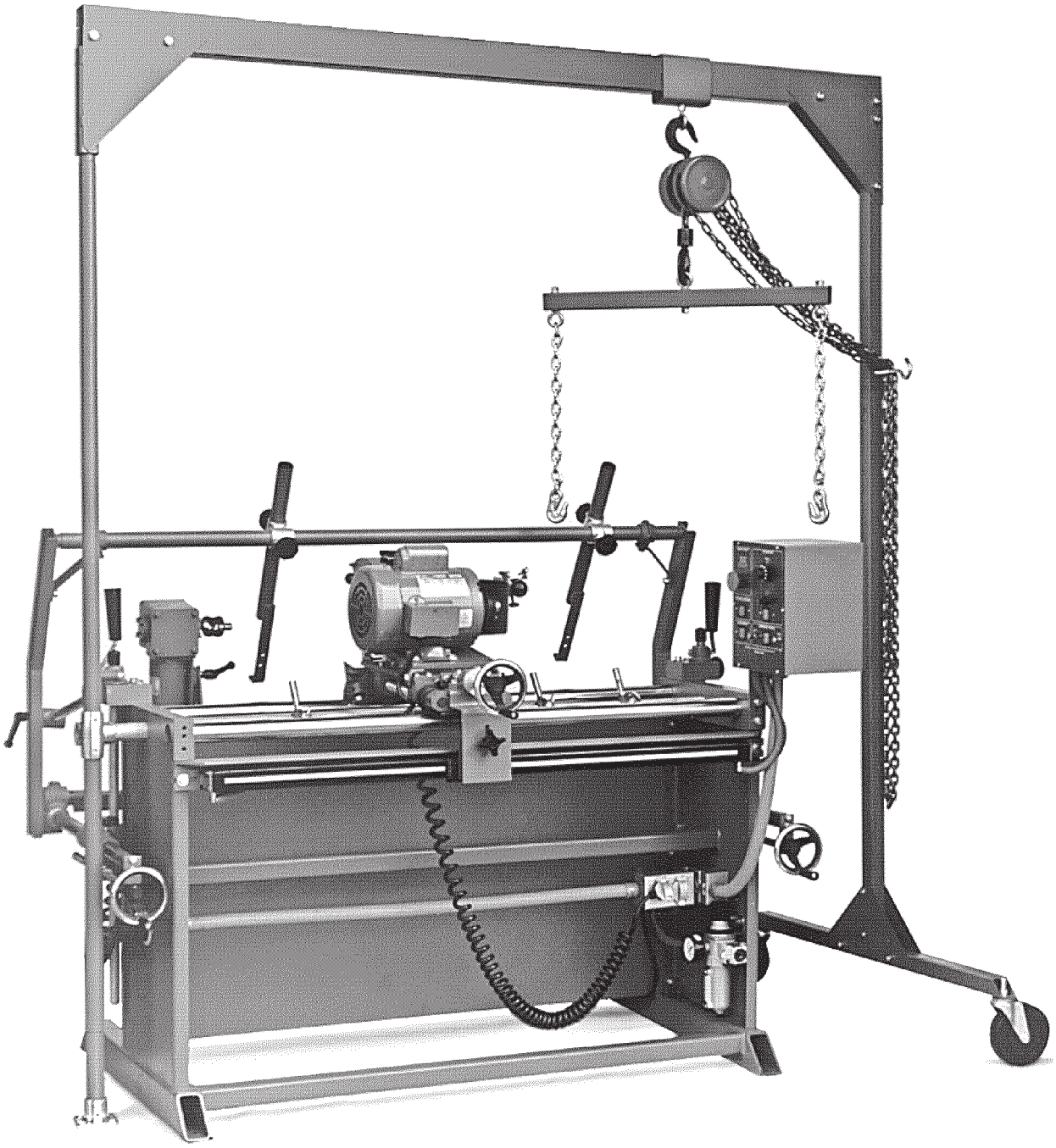
PEERLESS MODELS 1350 AND 1360
REEL GRINDER OPERATING MANUAL



PEERLESS MODELS 1350 AND 1360
REEL GRINDER OPERATING MANUAL

F1028-9311

CONTENTS

1. INTRODUCTION

1.0 Introduction

Thank you for selecting the Simplex•Ideal•Peerless Reel Mower Grinder. The New Model 1350 and 1360 Reel Mower Grinders are based on the time proven Peerless Grinder, incorporating many of the changes and improvements you have requested. Designed and built from top quality materials and components by people who care, the Model 1350 or 1360 Reel Mower Grinder should give you decades of service.

1.1 Safety Guidelines

The following is a list of general safety guidelines. Please read and understand these guidelines before proceeding. As is the case with most machinery, failure to operate it in a safe manner may result in injury or loss of life. Please be careful.

1.1.1 Always wear safety glasses and face shield when grinding!

1.1.2 Keep all guards in place and functioning properly.

1.1.3 Do not wear any loose clothing or jewelry which may get caught in the machinery. Secure long hair in a cap or net.

1.1.4 Keep your work area clean and organized.

1.1.5 Set up the work properly, using the correct tools and fixtures. Ensure that work is securely clamped.

1.1.6 When changing the grinding wheel, always unplug the motor to prevent accidental starting. Ensure that motor switch is off before plugging in.

1.1.7 Use the U-wrench provided when changing the grinding wheel and always ensure that nut is tight. Do not use additional tools to increase leverage when tightening nut as overtightening may damage the grinding wheel.

1.1.8 Always replace damaged grind-

ing wheel.

1.1.9 Never leave grinder running while unattended.

In addition to the safety guidelines just listed, there are safety notices through out this manual which are denoted as follows:

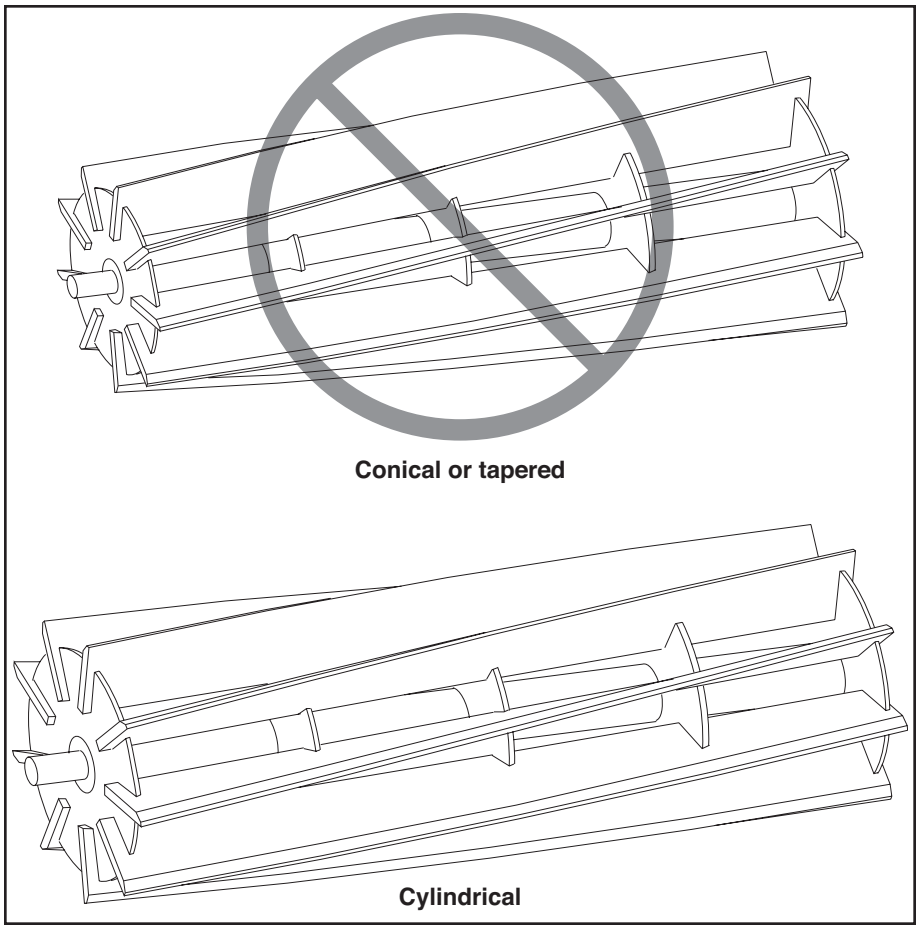
Always wear safety glasses and face shield when grinding!

Again, make sure that you read and understand these warnings before proceeding because failure to operate any machinery in a safe manner may result in injury or loss of life

1.2 Principles of Sharpening

The reel type lawn mower cuts grass using the principles of shears. It is necessary, therefore, to have two sharp cutting edges making close enough contact to cut the grass cleanly. This is the only method of mowing grass that is not harmful to the grass because each blade of grass is supported by the bed knife while the reel blade shears it off. This eliminates bleeding and brown tops which occur when the grass is whipped off with rotary type mowers.

On a five bladed reel mower, the bed knife does five times the work of any one reel blade as all the reel blades must shear against it. The bed knife, therefore, is the master cutting element and although made of heavier and harder steels, it is impossible to properly sharpen a mower with dull reel blades without



Conical or tapered

Cylindrical

sharpening the bed knife too.

Many mowers are successfully sharpened by grinding only the bed knife and restoring its shearing edge when the shearing edges of the reel blades are in fair condition. The reverse of this is never true due to the uneven work load imposed on the bed knife.

When a mower is brought in for servicing, it is important to determine why it is not cutting properly. Often, if the mower is operating satisfactorily in every respect except cutting the grass cleanly, it may only need an adjustment of the bed knife to the reel blades. Examination of the cutting edges and shearing corner on the reel blades and bed knife should determine if the mower needs a complete grinding job. Often, properly adjusting the bed knife and lapping the reel is all that is required.

If a complete grinding job is required, preparing the mower for sharpening is 75% of the job. The process of sharpening a lawn mower is really one of reshaping the cutting edge of the bed knife and the rotary reel blades by grinding, to restore their ability to cut grass. Equally important is the restoration of the match, or fit, of the reel blades to the cutting edge of the bed knife, against which all reel blades shear or cut.

For a mower to run easily and cut freely, it is important that proper bevel or relief angle be ground on both the bed knife cutting edge and the reel blades cutting edges. This gives clearance or relief behind the contacting edges and reduces drag and friction. Too little relief angle would leave more metal in contact causing the mower to run hard. Too much clearance or angle would weaken the cutting edges and they would nick easily and would not hold their edge.

2. SETUP & MAINTENANCE

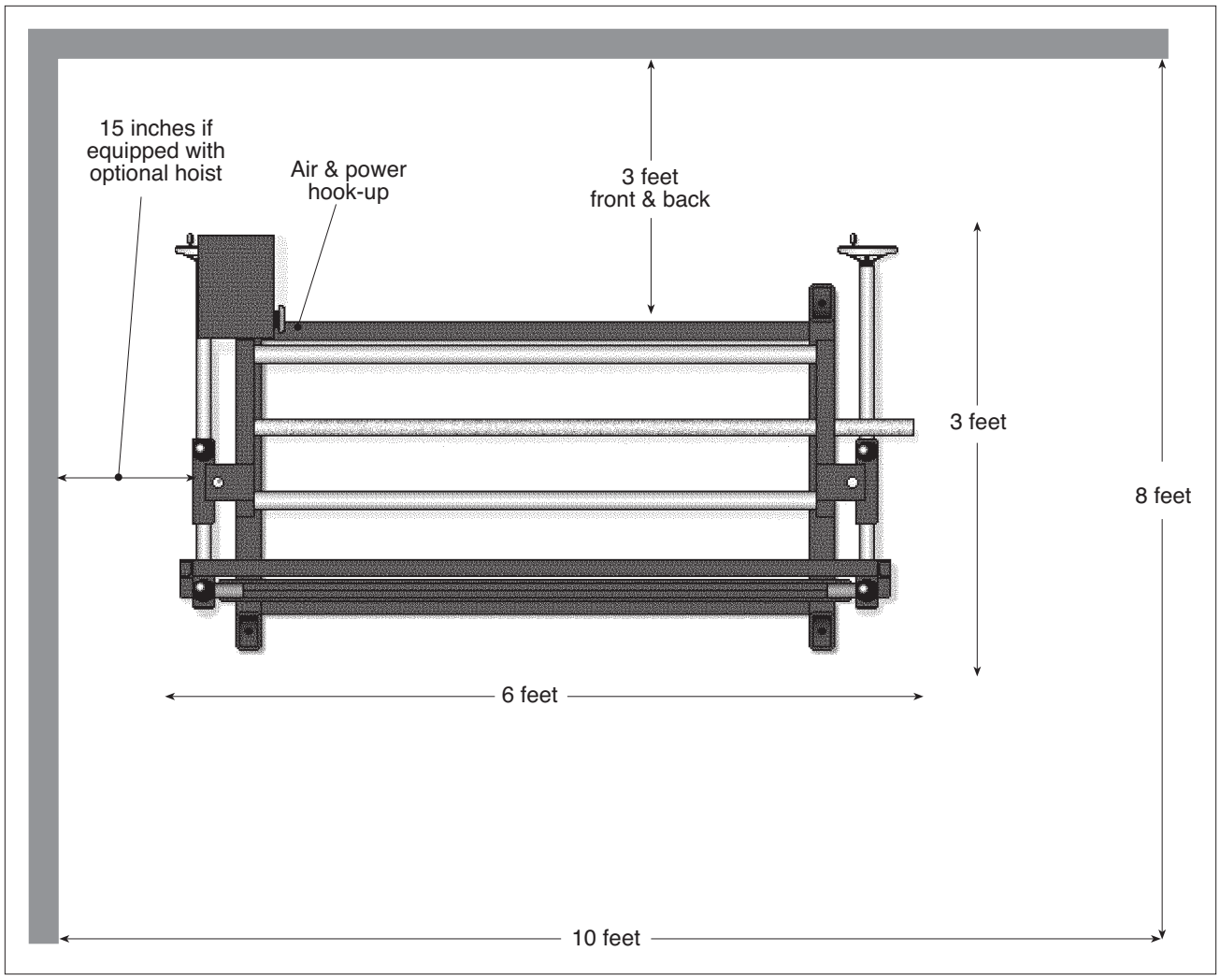


Figure 2.1 Locating your grinder

2.0 Locating Your Grinder

2.0.1 Determine where the reel mower grinder will be located. We recommend a solid concrete slab on which the grinder can be bolted. The grinder footprint is approximately 36 inches by 72 inches and we recommend about 8 by 10 feet of floor space. The reel is mounted on the back of the grinder and the operator works from the front of the grinder, so adequate working area must be provided around the reel grinder (Figure 2.1).

2.0.2 The grinder requires standard 110 volt, 60 Hz, single phase service. Foreign versions with 220 volt, 50 Hz, single phase are available. The grinder comes with an 8 foot grounded cord for 110 volt service.

2.0.3 The grinder also requires about one cfm of 70 to 100 psi clean compressed air.

2.1 Unpacking the Grinder

2.1.1 While unpacking, examine carefully for any shipping damage. Any damage noted should be reported immediately but must be reported within 10 days.

2.1.2 By now you have removed the plastic wrap from the main crate. Next, unbolt the base from the pallet and place it in the location you have selected as shown in Figure 2.1.

2.1.3 Loosen the locking knob on the grinding head vertical adjustment and lower the grinding head until it is loose from the overhead support bar (see Figure 2.2).

2.1.4 Loosen the thumbscrews on the carriage travel stops as shown in Figure 2.3 and allow them to swing out of the way.

2.1.5 To disengage the grinding head turn the locking knob, slide it up then relock it (see Figure 2.4). Gently roll the grinding head off the packing material.

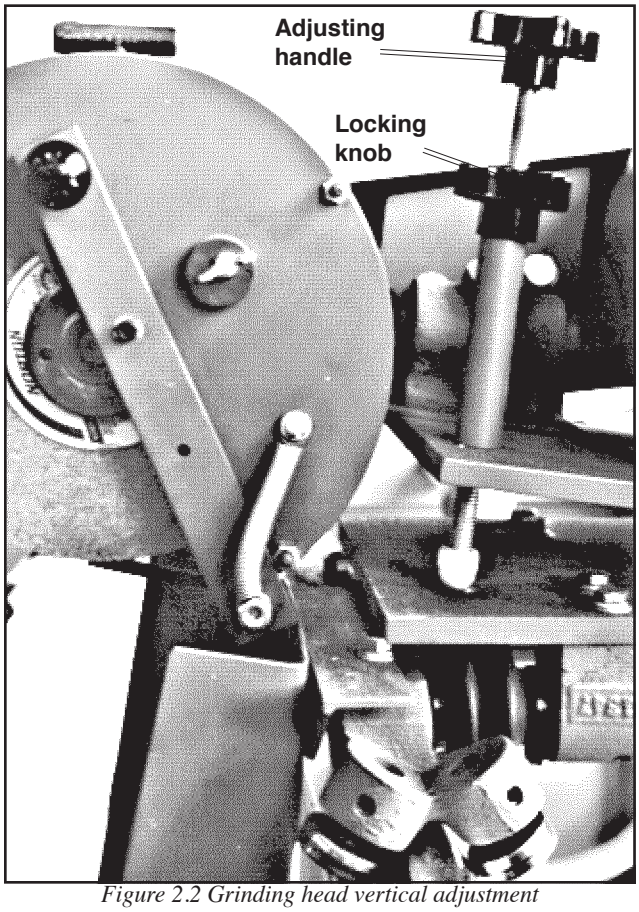


Figure 2.2 Grinding head vertical adjustment

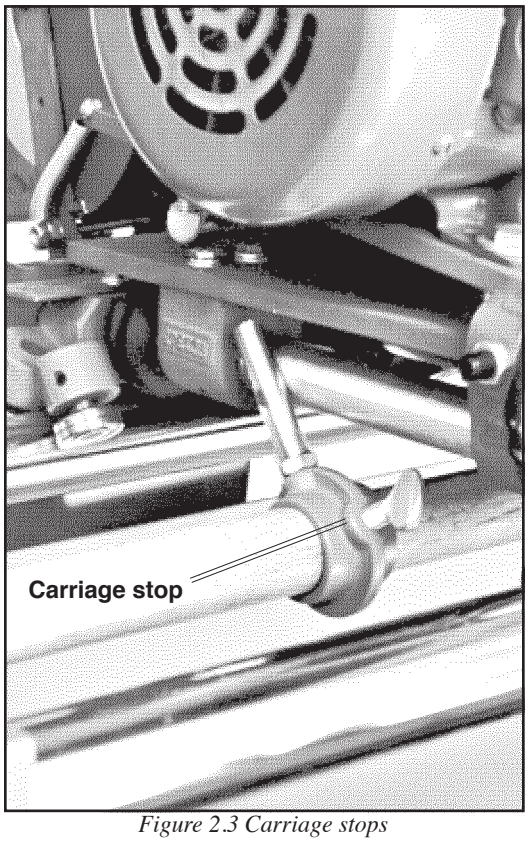


Figure 2.3 Carriage stops

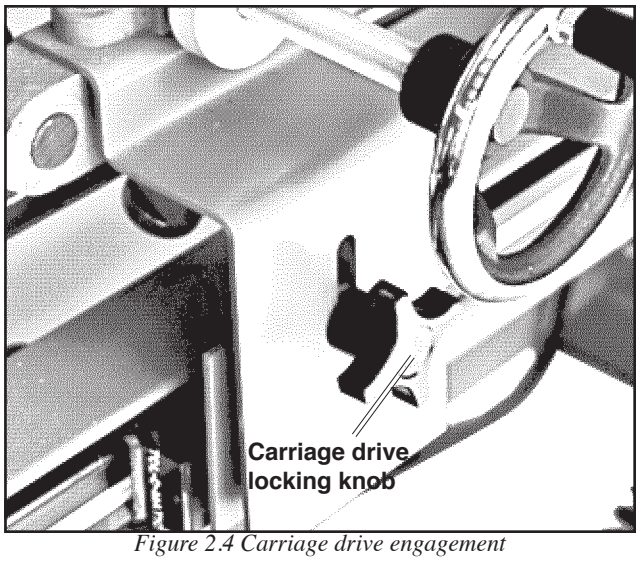


Figure 2.4 Carriage drive engagement

2.2 Leveling the Base

2.2.1 It is best to bolt the grinder to the floor and level it using shims, however, leveling pads may also be used.

2.2.2 With the grinder in its final location, use a good quality carpenters level across both track shafts as shown in Figure 2.5 and adjust until grinder is level.

2.2.3 Place the carpenters level along one of the track shafts and adjust until level as shown in Figure 2.6.

2.2.4 Recheck level in both direction, adjust as necessary. Bolt in place and recheck level.

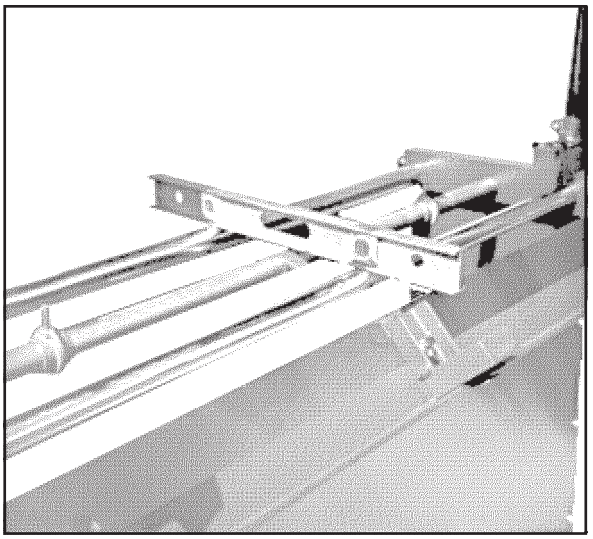


Figure 2.5 Level across track shafts

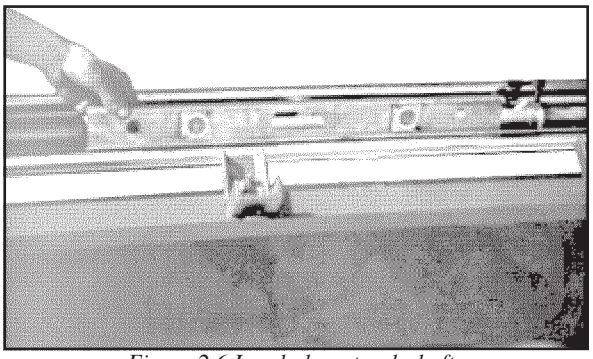


Figure 2.6 Level along track shafts

2.3 Mounting the spin motor

2.3.1 If you have an automatic grinder, it includes a spin motor which is mounted on the mower support bar (Figure 2.7).

2.3.2 Make sure the locking lever and knobs on the scissor brackets are tight.

2.3.3 Place the spin motor on one end of the mower support angle with its shaft facing the center of the grinder. Clamp it in place with the mounting clamp knob.

2.3.4 Plug and twist the motor plug into its receptacle on the same side as the spin motor is mounted.

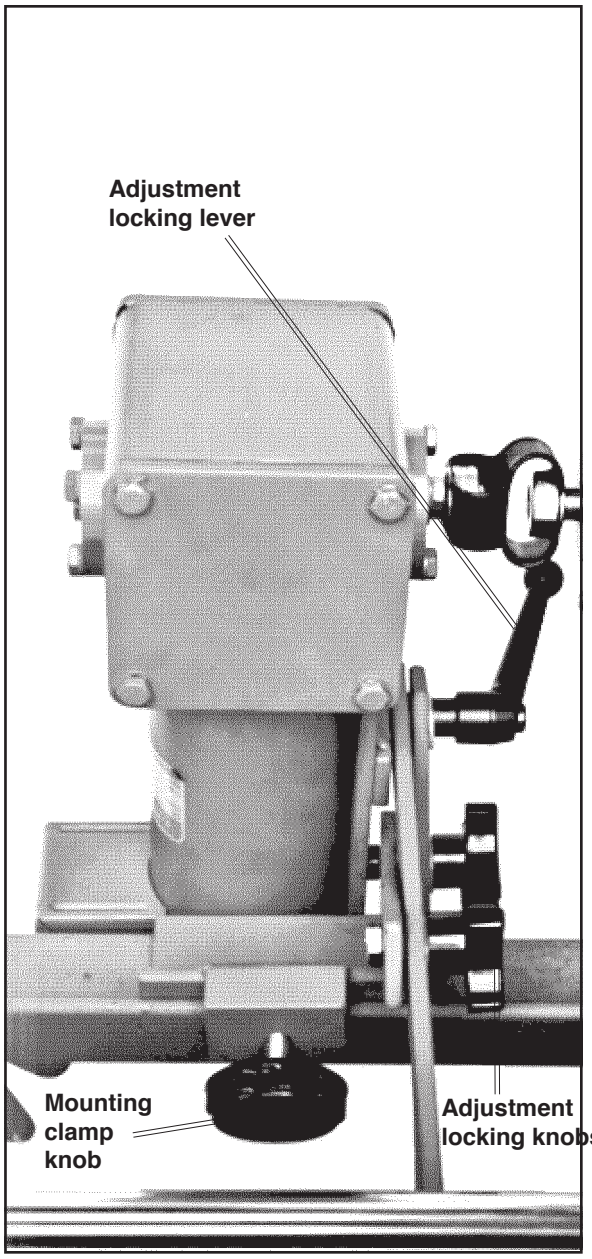


Figure 2.7 Spin motor

2.4 Turning the unit on

2.4.1 Make sure all assembly is complete and all fasteners are tight.

2.4.2 If you have an automatic grinder, connect the air supply to the filter regulator.

2.4.3 Plug in the grinder, turn the grinding motor on, and check for vibration. If there is excessive vibration check for loose fasteners or see if the grinding wheel is out of balance.

Always wear safety glasses and face shield when grinding! Stay clear of grinding wheel when turning grinder on!

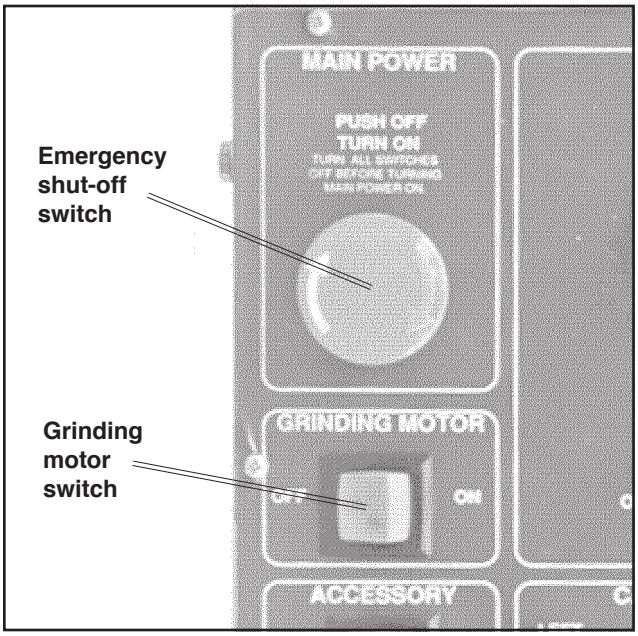


Figure 2.8 Grinding motor switch

2.5 General maintenance

2.5.1 The carriage bearings are permanently sealed and lubricated. They require no lubrication or attention except to be kept clean.

2.5.2 The track shafts must also be kept clean and free from grinding dust and may be turned occasionally to provide new track surfaces.

2.5.3 The grinder is equipped with a totally enclosed fan cooled motor which requires no regular maintenance. The motor should be cleaned periodically with either a vacuum or compressed air.

2.5.4 The feed screws should be oiled lightly as needed for easy operation. Wipe off all excess oil as grinding dust will stick to oiled surfaces and cause excessive wear.

2.5.5 If the grinder will not be used for an extended period of time, give all machined surfaces a coat of oil or some other rust preventative.

2.5.6 When the grinder is put back into service, it should be thoroughly cleaned of oil and rust preventative before grinding to prevent grinding dust from sticking and causing excessive wear.

2.6 Dressing the grinding wheel

2.6.1 Attach the dresser assembly the stud on the wheel guard.

2.6.2 Position it in the center of the wheel using either the mounting stud and two nuts or the eye bolt stud.

2.6.3 Adjust the dresser to achieve the desired radius for the grinding wheel.

2.6.4 Adjust the final position of the dresser assembly so that the dresser just misses the grinding wheel then tighten all adjusting nuts and clamp in place.

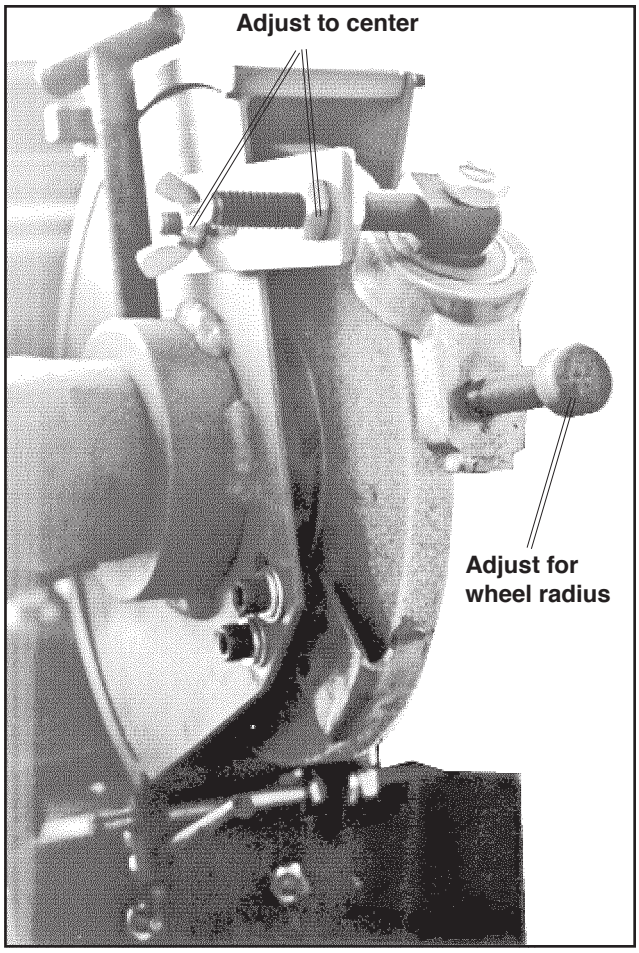


Figure 2.9 Diamond dresser

Always wear safety glasses and face shield when grinding! Stay clear of grinding wheel when turning grinder on!

2.6.5 Turn on the grinding motor.

2.6.6 Swing the dresser back and forth and screw it in until the wheel is adequately dressed. Back the dresser out so that it clears the grinding wheel.

2.6.7 Turn the grinding motor off.

2.6.8 Remove the dresser assembly.

2.7 Mounting the finger point

2. 7.1 Remove the two socket head screws which hold the finger point in place being careful to catch the washers and spacers as you remove the screws.

2.7.2 Replace the new finger point making sure that the washers and spacers are replaced in the same positions as when they were removed.

2.7.3 You can use either the front two holes or the back two holes in the finger point depending on the current wheel size.

2.7.4 Position the finger point so there is a small gap between the outside diameter of the grinding wheel and the finger point, then tighten the socket head bolts.

2.7.5 Make sure that the finger point is centered

on the grinding wheel. If it does not, you will need to reposition the grinding wheel hub on the shaft so that it is.

2.7.6 Make sure that the bolts which hold the finger point do not touch the grinding wheel. If they do, add washers underneath the bolt heads.

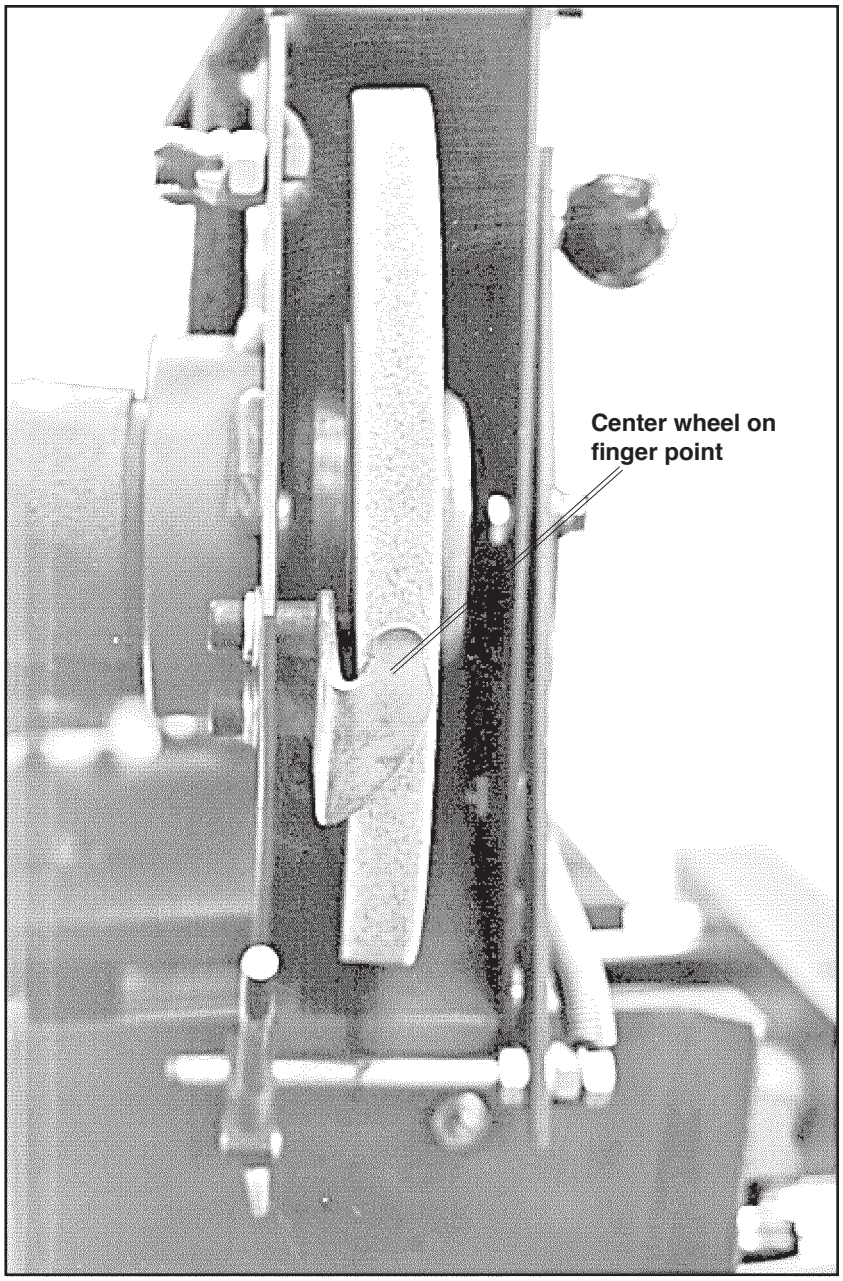


Figure 2.10 Finger point

2.8 Mounting grinding wheel

2.8.1 Unplug the grinding motor.

2.8.2 Remove three nuts which hold wheel guard cover in place and remove wheel guard cover.

2.8.3 Using the u-wrench provided, hold the grinding wheel and unscrew the wheel nut counterclockwise. Remove the grinding wheel.

2.8.4 Ring the new grinding wheel to ensure it is undamaged. Do this by holding it in the arbor hole and gently tapping it with a wooden handle of a screw driver or similar tool. If the grinding wheel does not ring do not use it.

Do not use damaged grinding wheel as it may come apart and cause damage, serious injury, or loss of life.

2.8.5 Place the new grinding wheel on the hub.

2.8.6 Replace the wheel nut and tighten firmly with the u-wrench provided. Do not use additional tools to increase torque as you may damage the grinding wheel.

Do not use additional tools to increase leverage when tightening nut as overtightening may damage the grinding wheel.

2.8.7 Replace the wheel guard cover and nuts.

3. Preparing to Grind

3.0 Introduction

It is impossible to cover the exact procedure necessary to sharpen every different make and model of reel lawn mower. You will have to use your own ability, and sometimes ingenuity, in following these general instructions and applying them to the many different types of mowers.

3.1 Preparing the reel mower for grinding

3.1.1 Clean all dirt, grass, rust, grease, and oil from the mower assembly, especially where it accumulates behind the lip of the bed knife.

3.1.2 Inspect for a wavy appearance or condition along the top face of the bed knife. This would indicate that the bed knife has been adjusted to the reel with excessive pressure. This could cause worn or loose reel bearings.

3.1.3 Check that the front spacer bar and the bed knife is not loose. If the frame is loose, it is probably out of alignment. Check the mower manufacturer's manual to reset alignment.

3.1.4 Check the reel for free rotation and examine the reel blades for bad nicks that might indicate a twist or sprung spider. Check to see that reel blades are securely fastened to the spiders and that the spiders are secure on the reel shaft. Repair as necessary.

3.1.5 Check for axial and radial play in the reel bearings. Adjust or replace the bearings in accordance with the manufacturer's manual.

3.2 Mounting the reel mower for grinding

Make sure all clamps and locking knobs are tight. Loose or shifting work can cause damage or serious injury.

3.2.1 Place the reel mower on the floor behind the grinder with the front of the mower facing the grinder.

3.2.2 Lift the reel mower and place its roller rest in the v-supports (Figure 3.1).

3.2.3 Attach the overhead clamps to the reel using one of three size clamps depending on where the attachment to the reel mower is made. You may also be able to bolt the reel mower directly to the clamps. Tighten the locking knobs on the overhead clamps

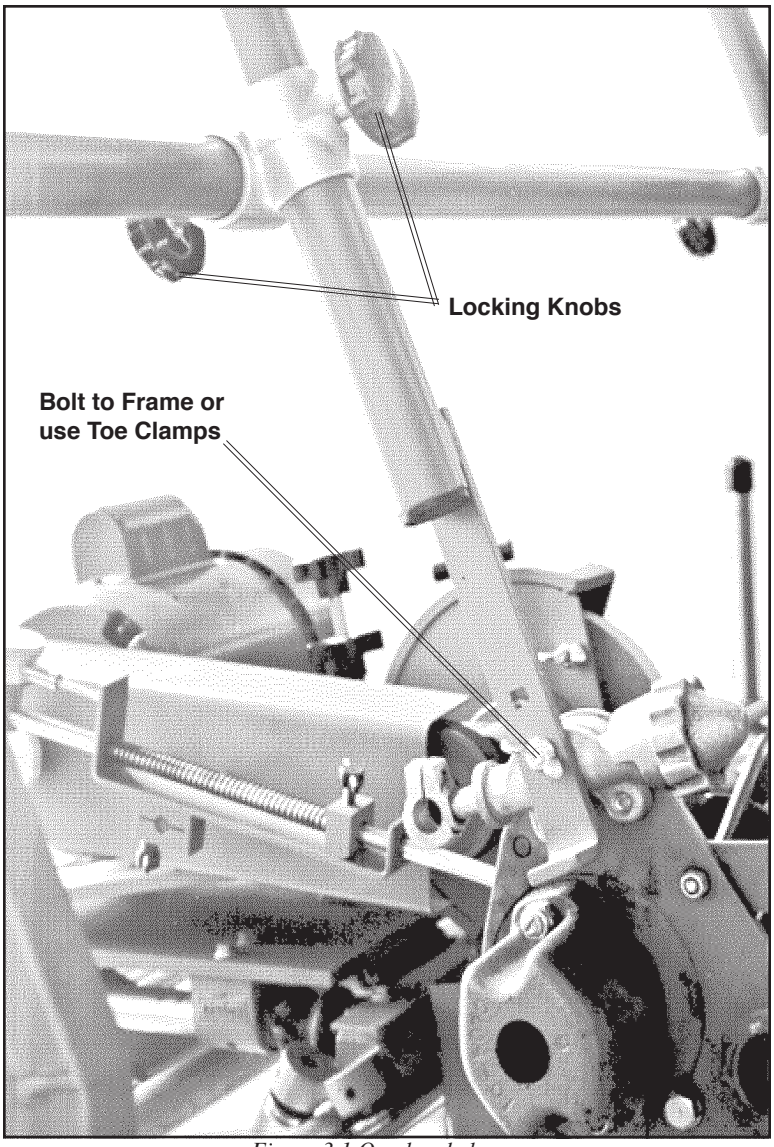


Figure 3.1 Overhead clamps

3.2.4 Use the chain clamps to clamp the roller into the v-supports.

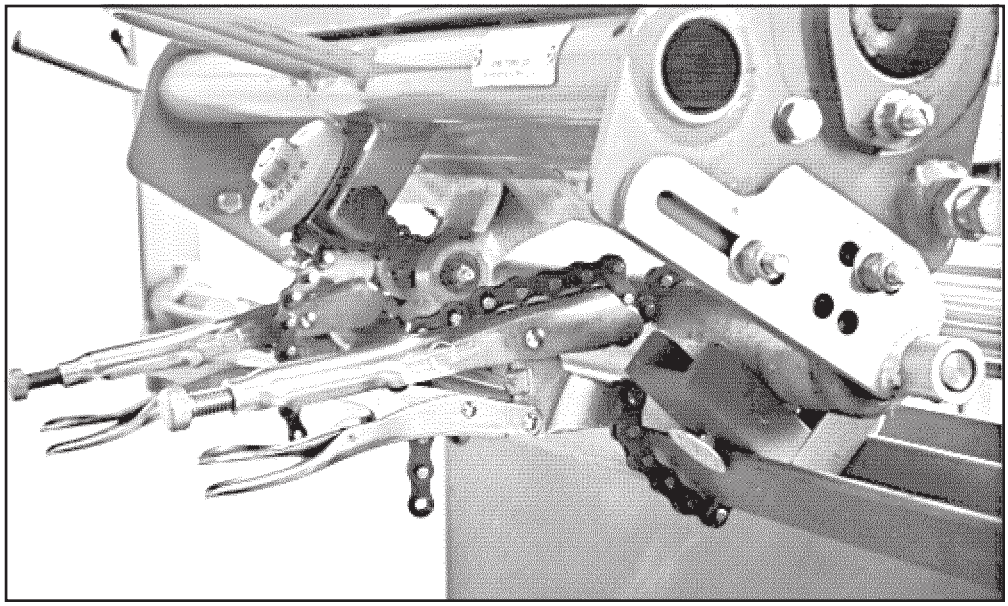


Figure 3.2 Chain clamps

3.3 Positioning the reel mower and grinding head

3.3.1 Adjust the grinding head to the center of its horizontal travel using its horizontal adjusting screw (see Figure 3.3).

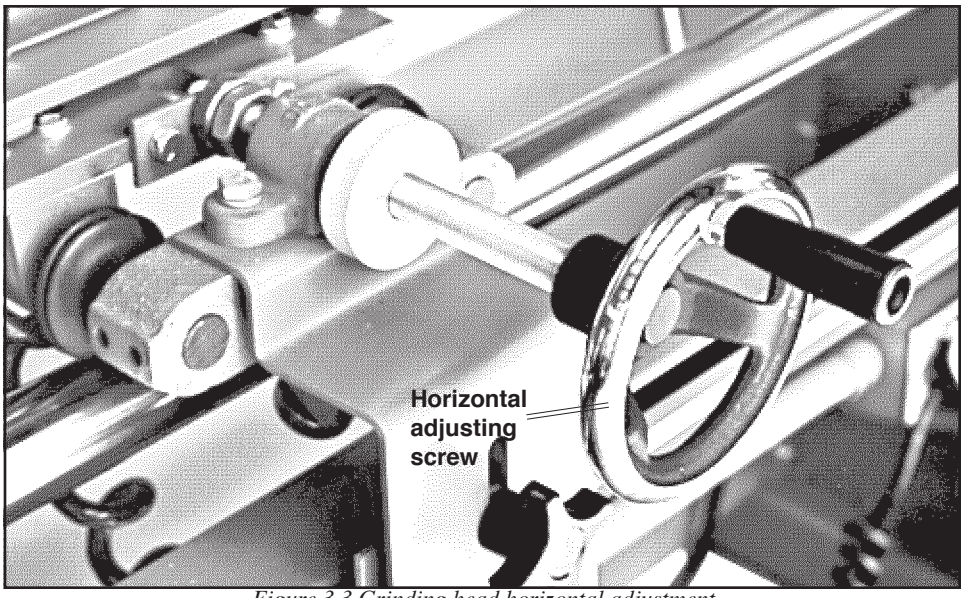


Figure 3.3 Grinding head horizontal adjustment

3.3.2 Adjust the reel up or down, using the reel support vertical adjusting screws, until the center of the reel is at about one to two inches below the center of the grinding wheel (see Figure 3.4). Since the finger point is adjustable, this position is not critical and you may find a better position for your type of reel (Figure 3.5).

3.3.3 Adjust the reel in or out, using the reel support horizontal adjusting screws, until the reel is within about $^1/_4$" of the grinding wheel

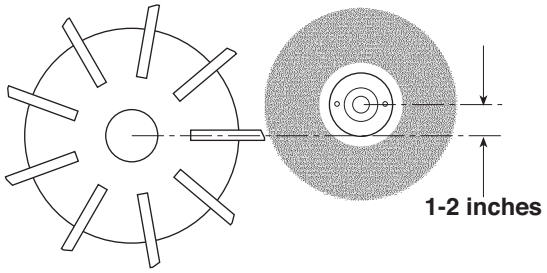


Figure 3.4 Reel position

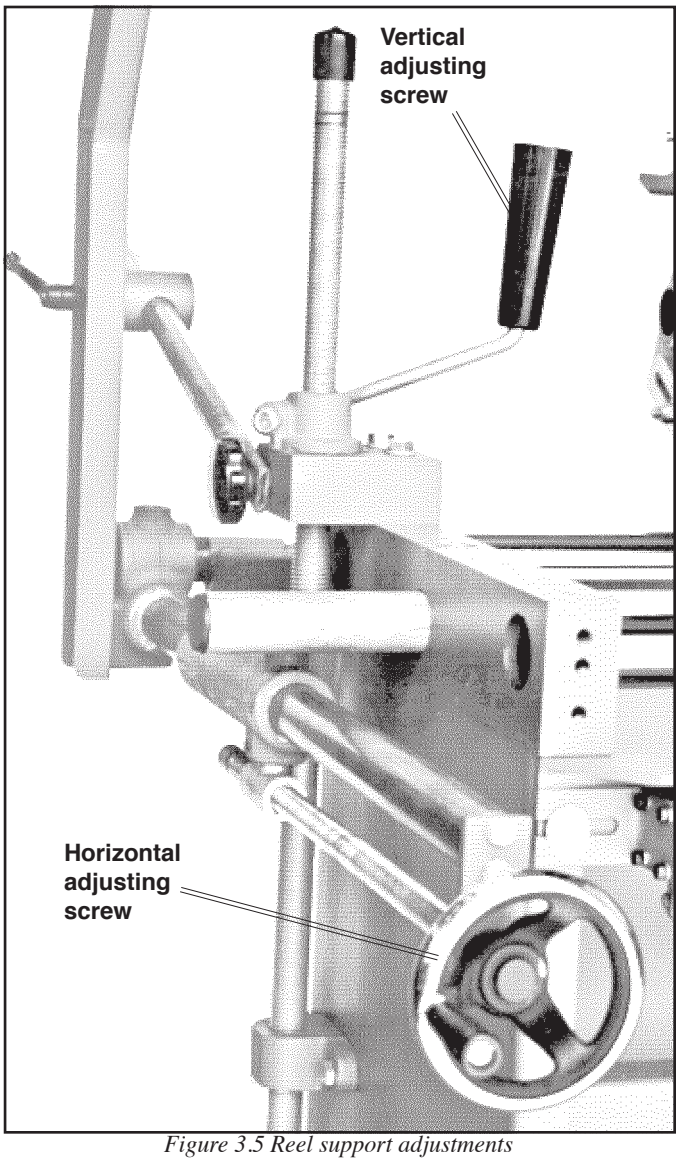


Figure 3.5 Reel support adjustments

3.5 Aligning the reel mower

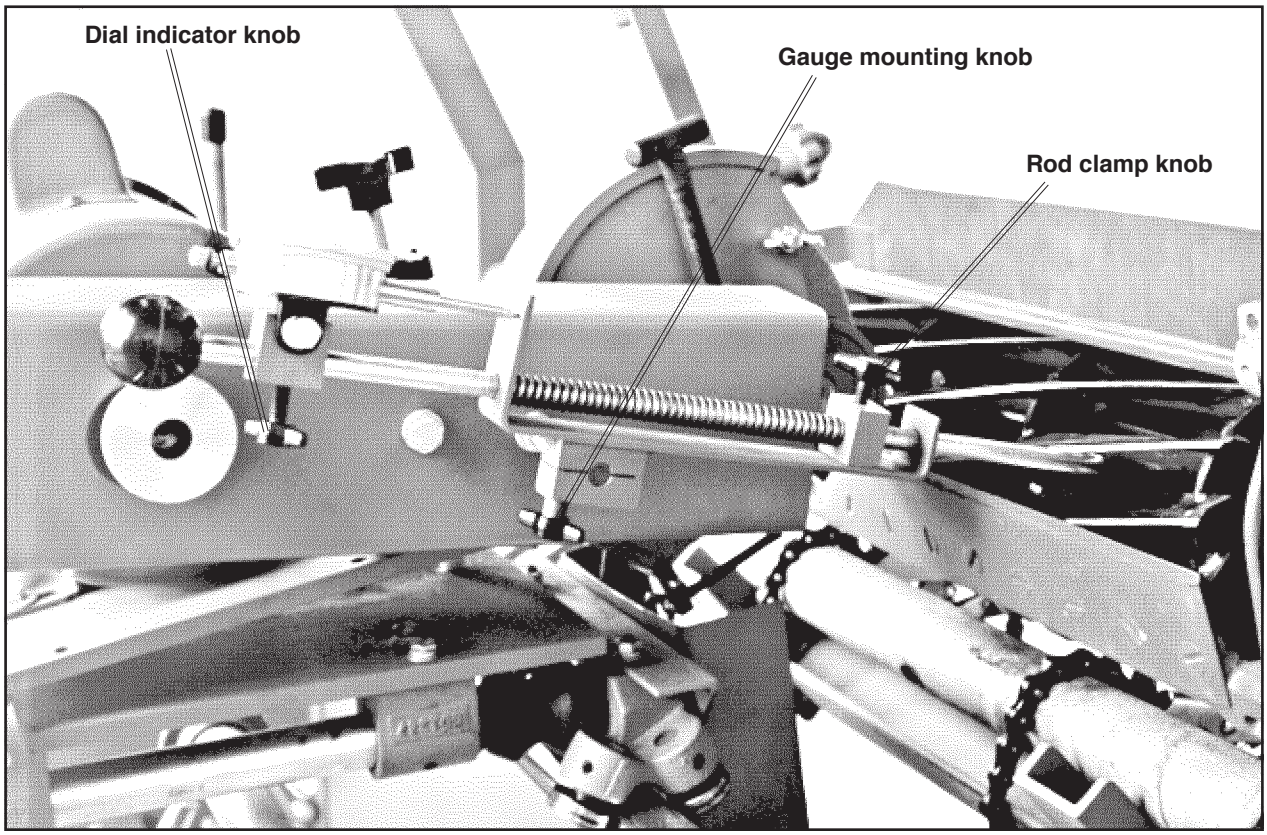


Figure 3.6 Setup gauge

3.5.1 Mount the alignment gauge on the stud as shown in Figure 3.6.

3.5.2 Disengage the carriage from the pneumatics (Figure 3.7) and move the carriage to one end of the reel.

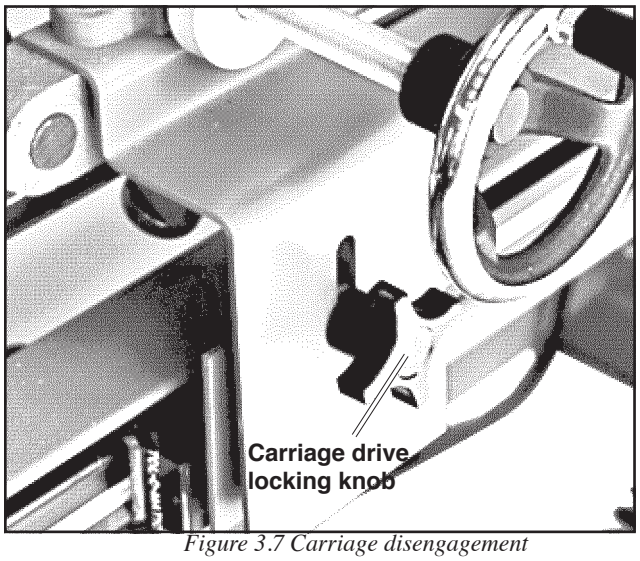


Figure 3.7 Carriage disengagement

3.5.3 Loosen the knob on the rod clamp and slide the gauge rod in to the reel over the reel's center shaft. Lock the rod clamp.

3.5.4 Rotate the gauge so that the gauge rod just touches the top of the reel's center shaft Figure 3.8. Tighten the mounting clamp.

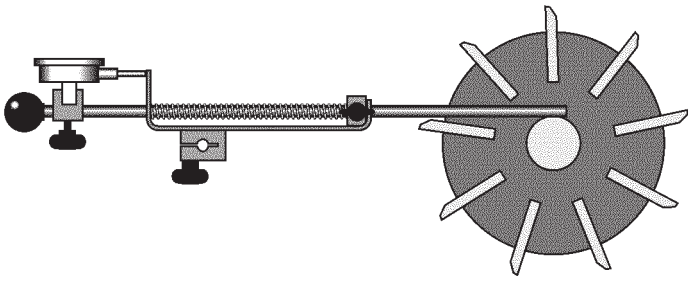


Figure 3.8 Vertical alignment

3.5.5 Pull the gauge rod out so that it clears the reel and move the carriage to the other end of the reel.

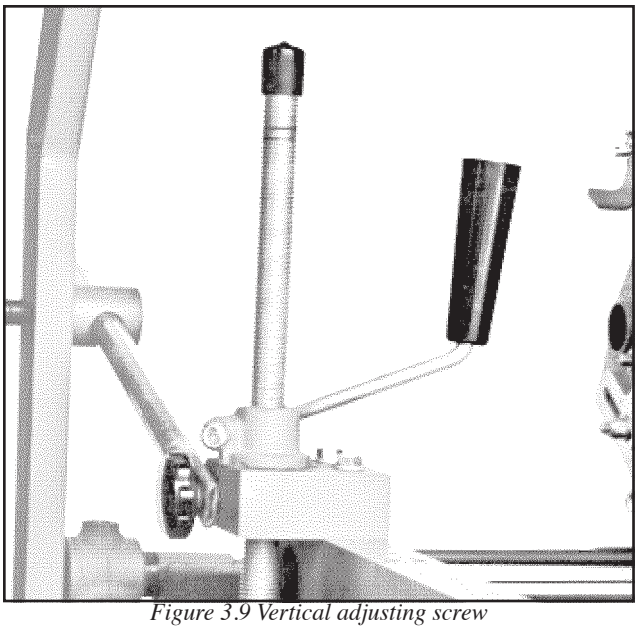


Figure 3.9 Vertical adjusting screw

3.5.6 Gently release the gauge rod. Make sure the reel frame locking knobs are loose (see figure 3.13) Adjust the mower support on that end until the gauge rod just touches the top of the reel's center shaft.

3.5.7 Pull the gauge rod out so that it clears the reel and move the carriage to the first end of the reel. Double check to see that the gauge rod just touches the top of the reel's center shaft. Repeat until the gauge rod just touches the top of the reel's center shaft at both ends.

3.5.8 For the horizontal alignment, gently pull back on the gauge rod against the spring and rotate the gauge on the mounting stud so that the gauge rod rests against the reel's center shaft (Figure 3.10).

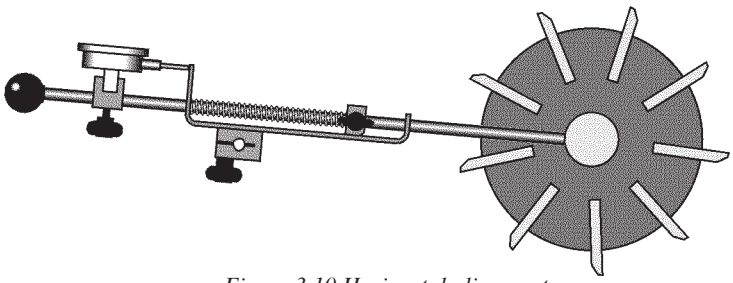


Figure 3.10 Horizontal alignment

3.5.9 Position the dial indicator on the gauge rod so that it contacts the gauge bracket, then set the dial indicator to zero (Figure 3.11).

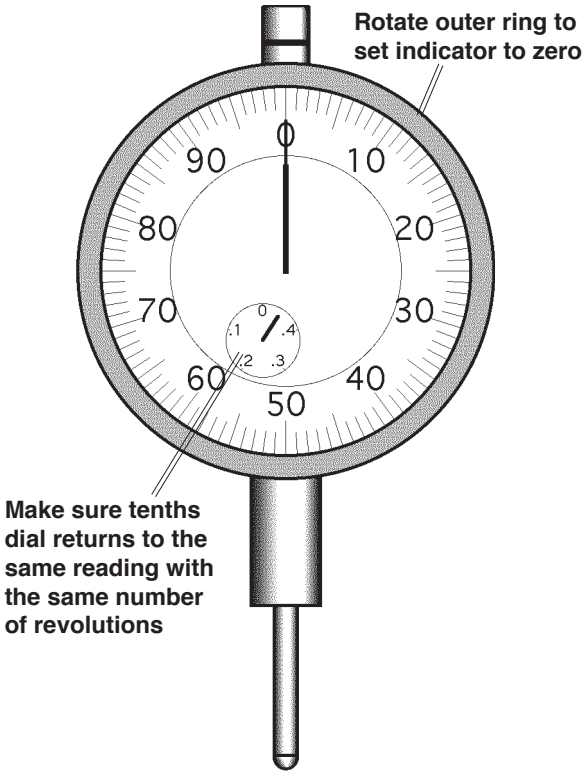


Figure 3.11 Dial indicator

3.5.10 Pull the gauge rod out so that it clears the reel and move the carriage to the other end of the reel.

3.5.11 Gently release the rod. Adjust the mower support until the dial indicator reads zero. Make sure the tenths dial returns to the same reading with the same number of revolutions.

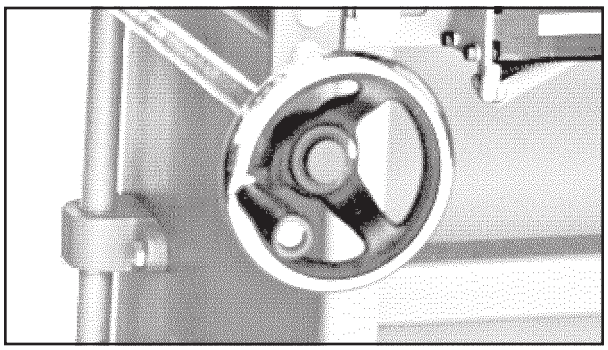


Figure 3.12 Horizontal adjusting screw

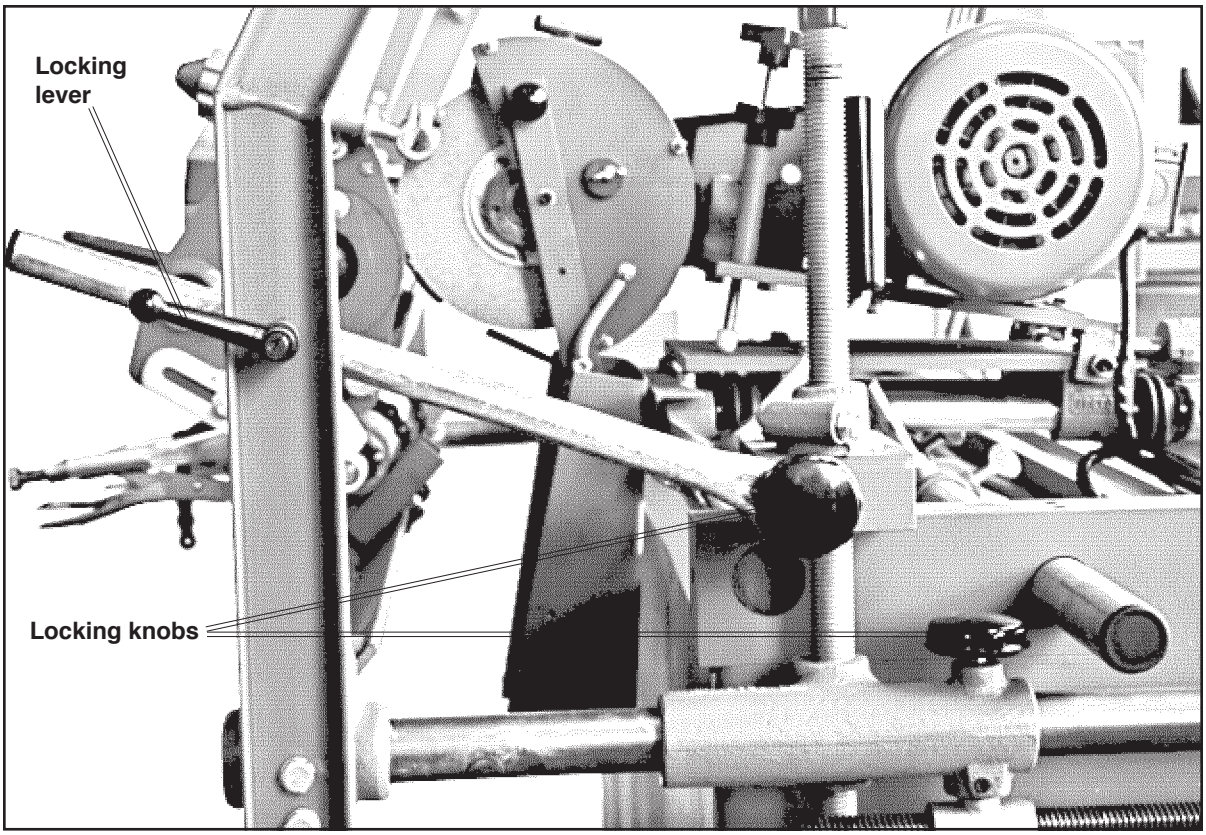


Figure 3.13 Reel frame locking knobs

3.5.12 Repeat the process until both ends of the reel read zero.

3.5.13 Tighten the locking knobs then the locking lever on the reel support frame as shown in Figure 3.13.

Make sure all clamps and locking knobs are tight. Loose or shifting work can cause damage or serious injury.

3.5.14 Recheck the alignment on both ends of the reel. Tightening the frame will cause it to move a few thousandths, however, both ends should move the same amount.

3.5.15 Loosen the gauge mounting knob and remove the setup gauge.

3.6 Setting the carriage travel stops.

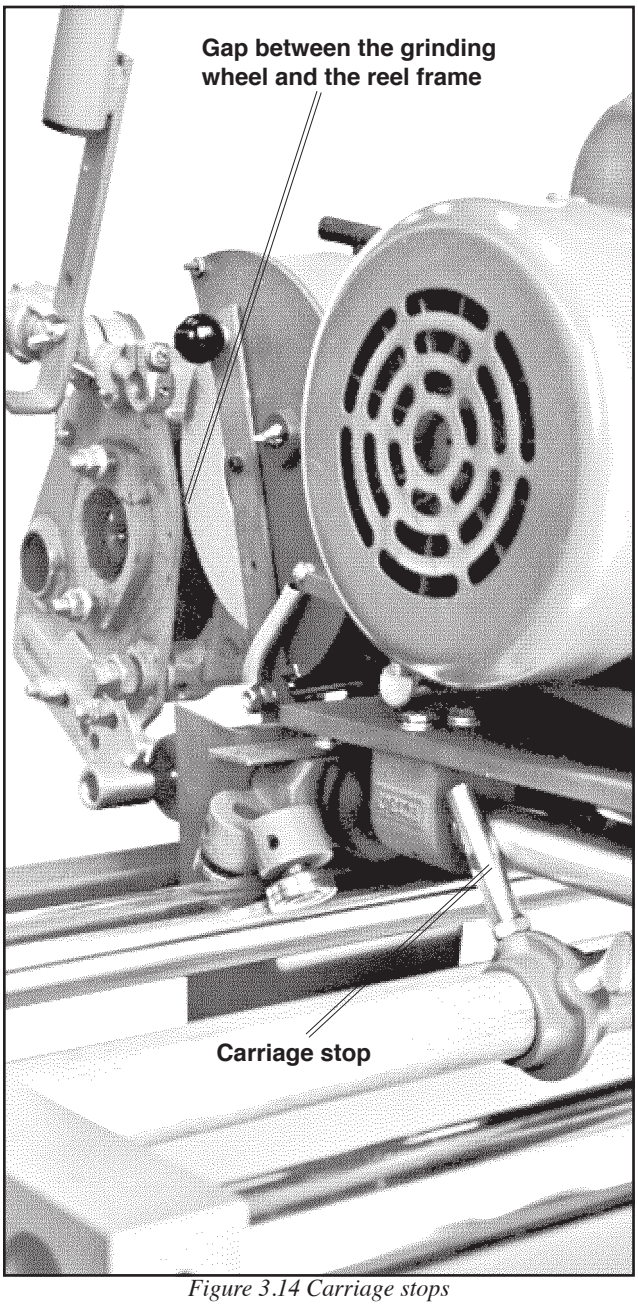


Figure 3.14 Carriage stops

3.6.1 With the grinding head still disengaged from the carriage travel, move the grinding head to one end of the reel so that the grinding wheel is just off the end of the reel blade and does not touch the reel frame. Some mowers do not have enough clearance for the grinding wheel to completely clear the end of the reel blade.

3.6.2 Loosen the thumb screw on the carriage stop and slide the stop so it touches the aluminum tube on the grinding head carriage, then tighten the thumb screw.

3.6.3 Move the grinding head to the other end of the reel and set the stop for that end.

3.6.4 The third middle stop is for spin grinding conical reels. It can be set a few inches past where the grinding wheel stops grinding to shorten the stroke. As the grinding wheel increases the length of contact, the middle stop can be moved so that it is always a few inches past where the grinding wheel looses contact with the reel. When almost the whole length of the reel is being ground, the middle stop can be loosened and swung out of the way.

4. Relief then Spin Grinding

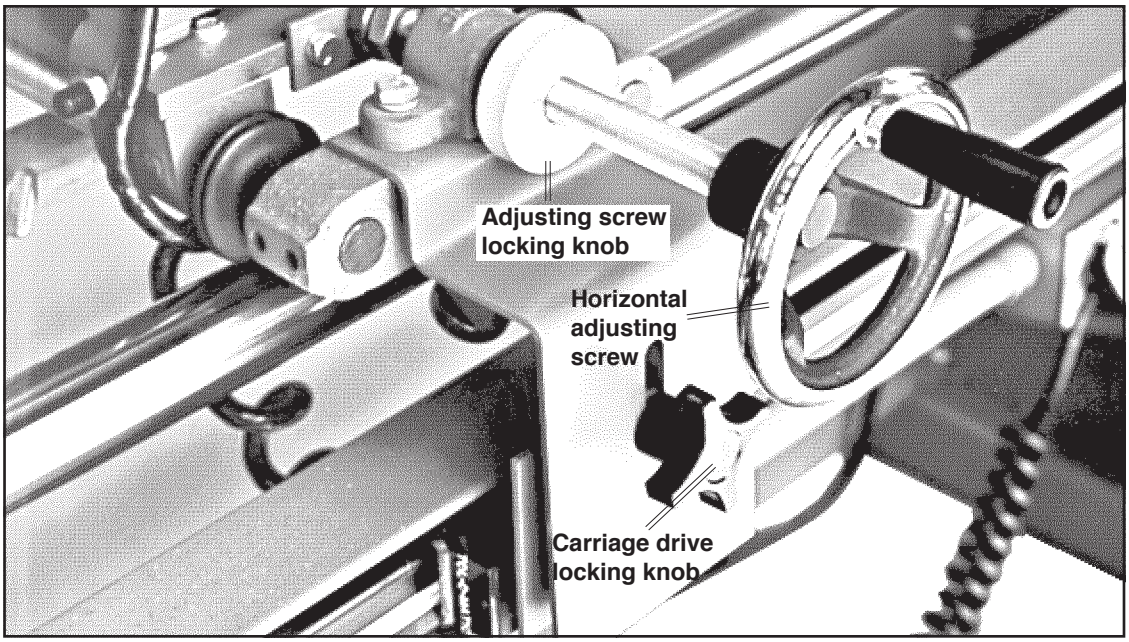


Figure 4.1 Carriage

4.0 Setting the relief angle

4.0.1 Disengage the grinding head from the pneumatic drive and move the grinding wheel to one end of mower. Adjust the head assembly in with the horizontal adjusting screw until contact is made with one of the reel blades, as it is rotated back and forth past the grinding wheel (see Figure 4.1)

4.0.2 When the blade is just touching the wheel, rotate the reel blade below center on the grinding wheel, adjust the grinding wheel in with the horizontal adjusting screw 2-4 turns until the grinding wheel is touching the reel blade at the correct angle of relief, then lock with locking knob. This should set the relief at about 15° (Figure 4.2). With this adjustment, the reel blade, when rotated up, will contact the wheel and not pass.

4.0.3 Loosen the t-bolt which clamps

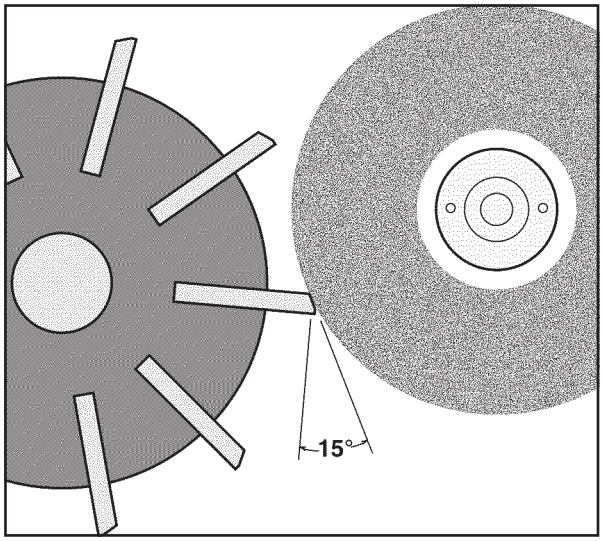


Figure 4.2 Relief angle

the wheel guard. Rotate the wheel guard until the finger is holding the reel blade gently against the grinding wheel. Do not apply force to the finger, just position it firmly against the bottom of the reel blade. Tighten the t-bolt to lock the finger point at this position (Figure 4.3).

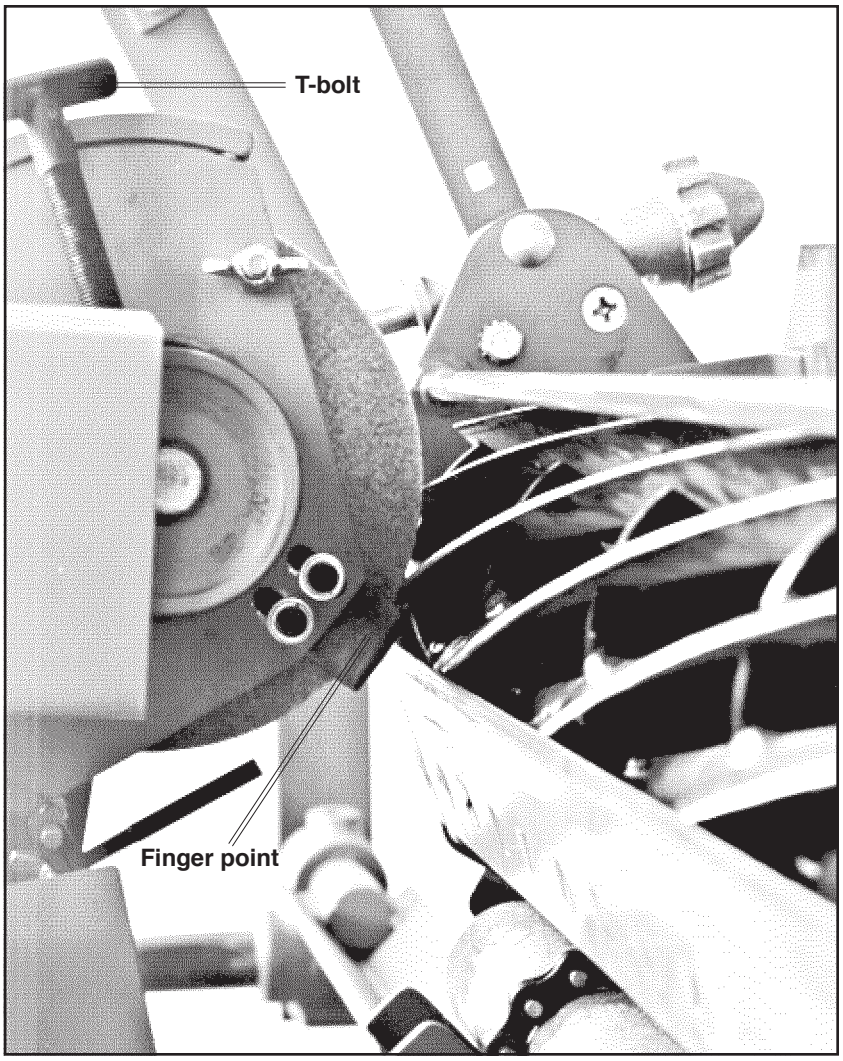


Figure 4.3 Finger point adjustment

4.0.4 With the grinding head against the left end stop, rotate the reel blades to make sure they clear the grinding wheel and finger point. If they do not, adjust the position of the carriage stop so there is adequate clearance.

4.0.5 Move the grinding head to the right end of the reel making sure that there is no interference.

4.0.6 Repeat step 4.0.4 for the right end.

4.0.7 Move the grinding head back to the left end of the reel.

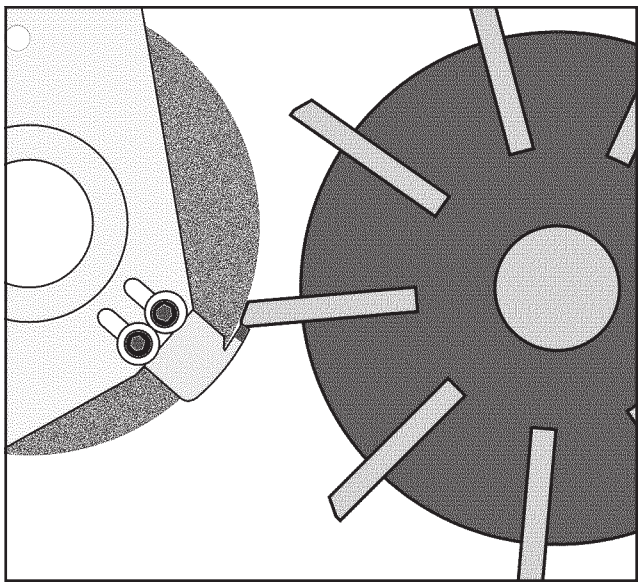


Figure 4.4 Finger point position

4.1 Setting the EZ Indexer™

4.1.1 The indexer should only need adjustment if the finger point is changed or adjusted or if you change from a right hand spiral to a left hand spiral and visa versa.

4.1.2 If the reel has a right hand spiral (the right end of the spiral blade is higher), you will set the indexer on the left end of the reel with the indexing stop on the right side of the grinding wheel. If the reel has a left hand spiral, you will set the indexer on the right end of the reel with the indexing stop on the left side of the grinding wheel. The following instructions will be for a right hand spiral and the ends indicated would be reversed for a left hand spiral.

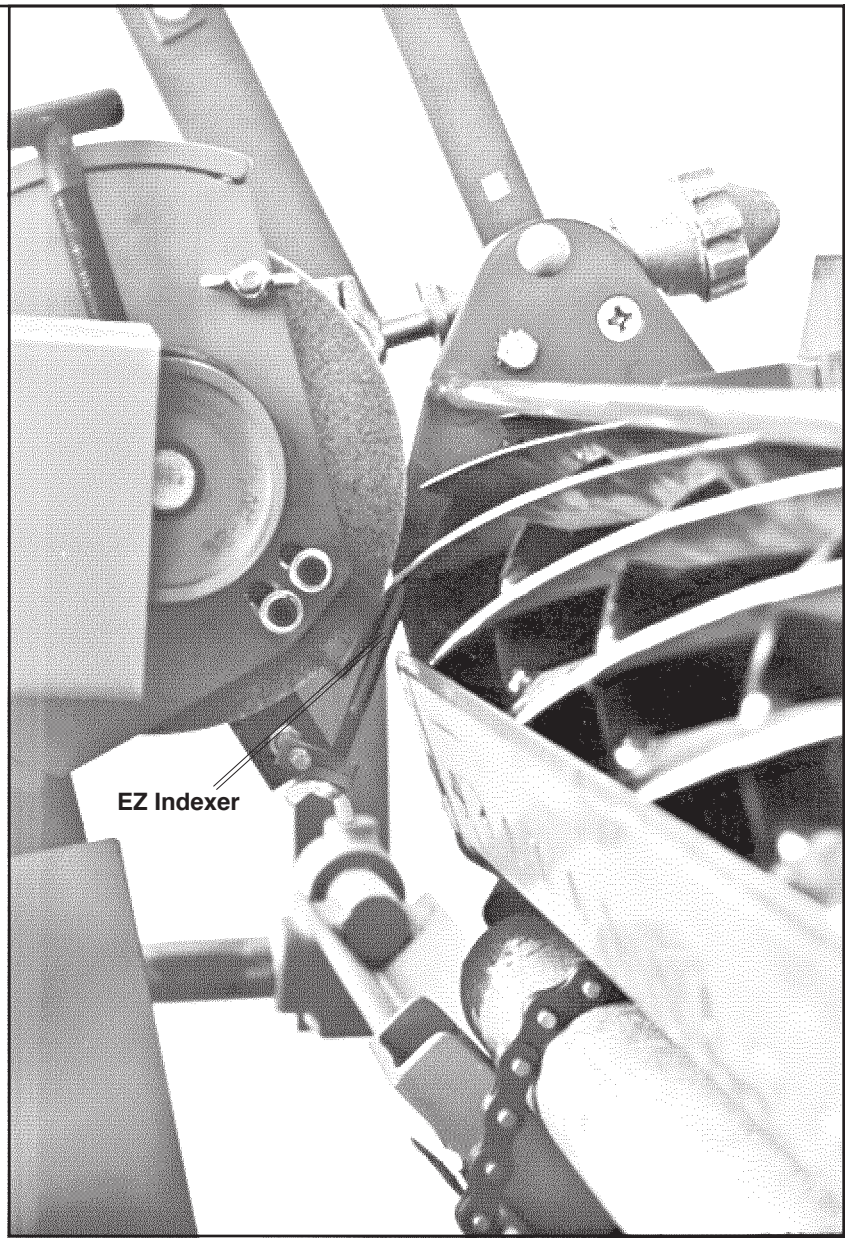


Figure 4.6 Setting the EZ Indexer

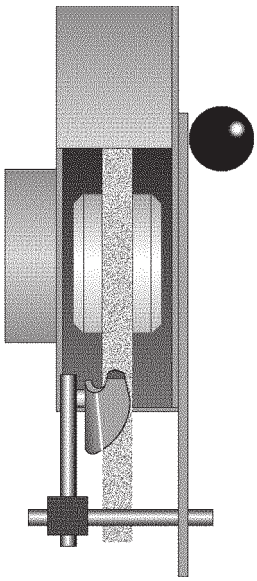


Figure 4.5 Indexer Position

4.1.3 With the grinding head on the left end of the reel, carefully move it to the right and align a reel blade between the finger point and the grinding wheel.

4.1.4 Move the grinding head off the left end of a blade.

4.1.5 Without moving the reel blade, swing the indexer up until it just touches the bottom of the reel blade.

4.1.6 Loosen the thumb screw on the indexer stop and rotate it until it is

positioning the indexer stop on the bottom of the reel blade. Additional adjustment is available by screwing the indexing stop in its block. Move the carriage back and forth to ensure that the indexing stop locates the reel blade so the finger point easily reengages the reel blade (Figure 3.10).

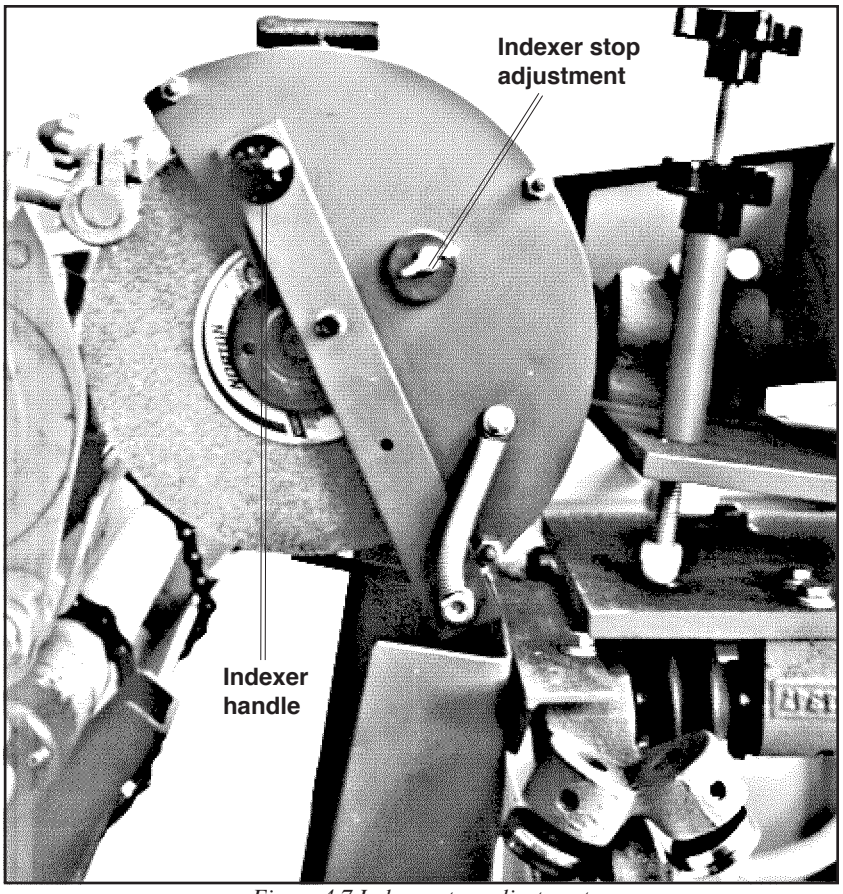


Figure 4.7 Indexer stop adjustment

4.1.7 When the finger point clears the end of the blade, you can index it using the following steps:

4.1.7.1 Rotate the reel down until the blade is past the indexing stop.

4.1.7.2 Pull the indexer handle against its stop.

4.1.7.3 Set the next blade down on to the indexing stop.

4.1.7.4 Release the indexer handle.

4.2 Checking the relief angle

4.2.1 With the carriage travel disengaged, move the grinding head against the left stop

4.2.2 Set the reel blade position with the indexer as described in Section 4.2.

Always wear safety glasses and face shield when grinding! Stay clear of grinding wheel when turning grinder on!

4.2.3 Turn on the grinding motor.

4.2.4 Carefully move the grinding head on to the reel blade and grind about one half inch, then move the grinding head back against the stop and turn it off.

4.2.5 Inspect the angle. Readjust if necessary per Section 4.0.

4.3 Setting the carriage travel speed

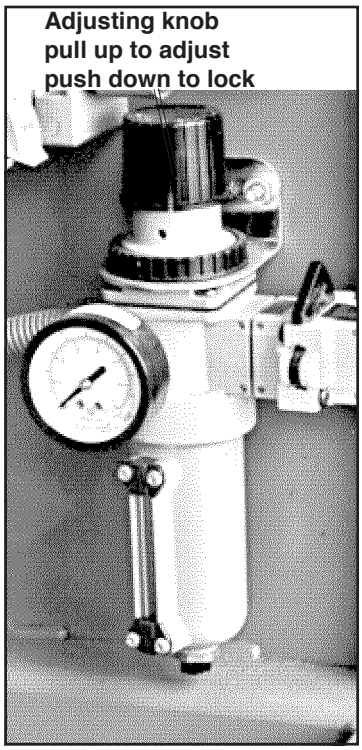


Figure 4.8 Filter-regulator

4.3.1 Make sure your filter-regulator is set at about 50 psi.

4.3.2 Make sure the grinding head is disengaged.

4.3.3 Turn the carriage travel switch on.

4.3.4 Adjust the flow control valves until you have the desired speed in either direction.

4.3.5 Turn the carriage drive off when it is aligned with the grinding head at the end of the reel by sliding the engagement knob into the carriage drive slot as it passes.

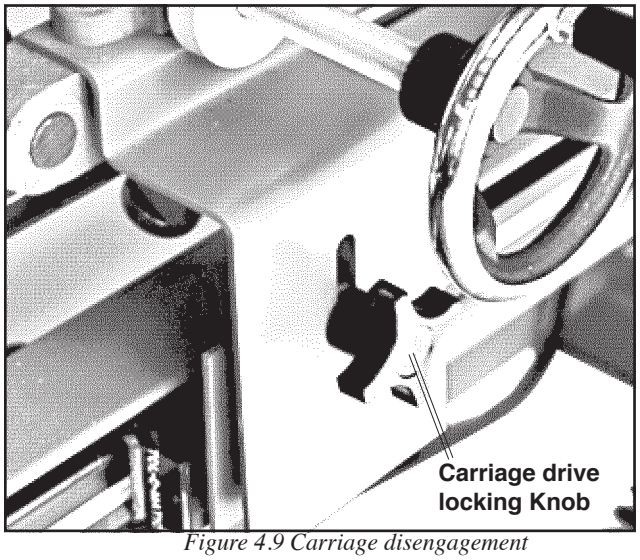


Figure 4.9 Carriage disengagement

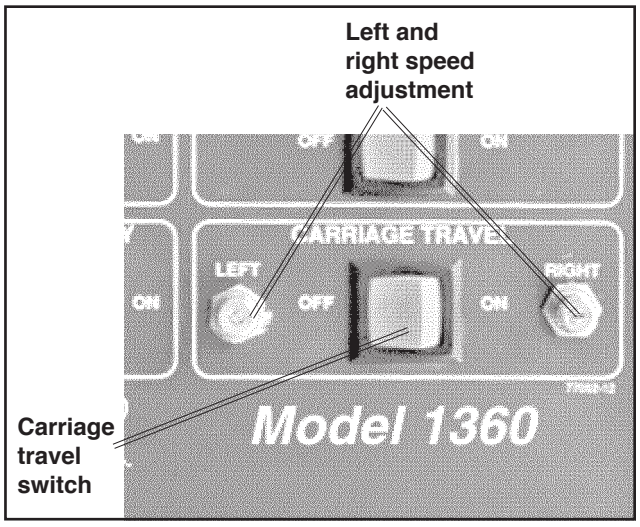


Figure 4.10 Grinding motor switch

4.4 Relief grinding

Make sure all clamps and locking knobs are tight. Loose or shifting work can cause damage or serious injury.

4.4.1 If you are confident that the set up is correct and that you can index properly, you are ready to proceed.

4.4.2 Make sure that the reel blade will rest on the indexing stop.

4.4.3 With chalk or magic marker, number the reel blades.

Always wear safety glasses and face shield when grinding! Stay clear of grinding wheel when turning grinder on!

4.4.4 Turn the grinding motor on.

4.4.5 Turn the carriage travel on. There will be a pause of 5 to 15 seconds before the grinding head moves and at the end of each stroke. The length of the pause at each end of the stroke is dependent on the speed of the carriage travel. The slower the travel, the longer the pause. Readjust the speed control so that grinding wheel cuts smoothly without burning. The speed on the return stroke can be slower in order to give a better finish.

4.4.6 The grinding head should grind away 50-80% of the face of the blade for proper relief. This should take one to three passes of the grinding wheel.

4.4.7 If on the return stroke, the grinding wheel does not contact the reel blade, the finger point is not tight enough against the reel blade. To adjust, turn the carriage travel of at the beginning of the stroke, then turn the grinding motor off. Readjust the finger point per paragraph 4.1.3.

4.4.8 When the proper relief has been achieved, while the carriage is pausing at the index end, index to the next blade as you have previously practiced.

4.4.9 Repeat until all blades have been ground.

4.4.10 At the end of the last stroke turn the carriage travel off then turn the grinding motor off.

4.5 Attaching the spin motor to the reel

Make sure all clamps and locking knobs are tight. Loose or shifting work can cause damage or serious injury.

4.5.1 The spin motor should turn in the same direction as the grinding wheel. It is wired so that it must be plugged into the same side as it is mounted and it will automatically turn in the correct direction.

4.5.2 If you need to change the side on which the spin motor is mounted

4.5.2.1 Twist and unplug the spin motor plug.

4.5.2.2 Hold the spin motor with one hand and loosen the locking knob which clamps the unit to the cross angle.

4.5.2.3 Lift the assembly off the cross angle, turn it around, and place it on the other end of the cross angle.

4.5.2.4 Clamp the unit on to the cross angle with the locking knob.

4.5.2.5 Plug and twist the spin motor plug in its receptacle on the same side as unit is mounted.

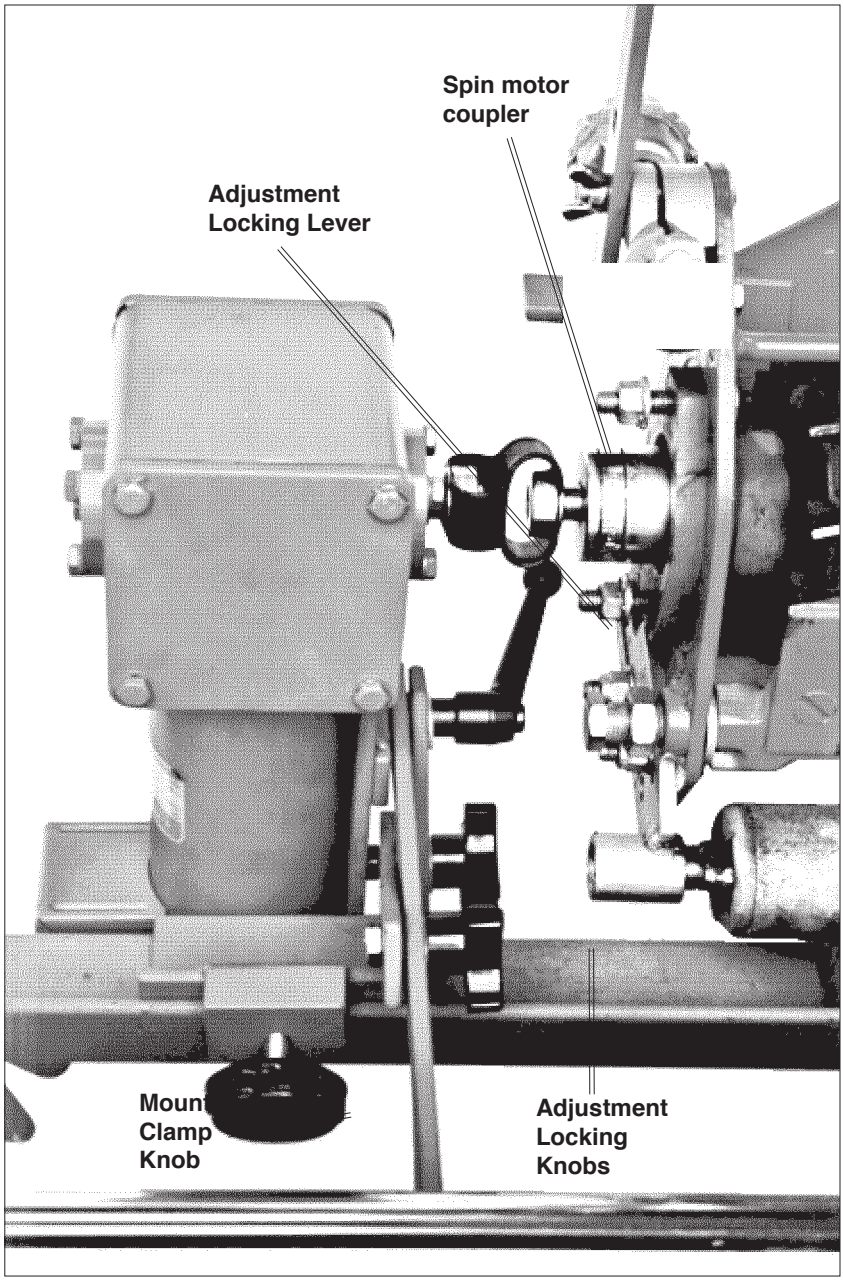


Figure 4.11 Spin motor

4.5.3 Select a $^1/_2$" drive socket that will fit the drive of your reel mower and place it on the $^1/_2$" drive shaft of the spin motor. Some mowers may require simple adaptor plates.

4.5.4 Unclamp the spin motor from the cross angle, move it to within about one inch of the reel mower and reclamp the spin motor to the cross angle.

4.5.5 Hold the spin motor with one

hand and loosen the locking knobs and the locking lever on the scissor brackets. Move the spin motor until the socket aligns with the nut on the reel drive nut. Retighten the locking knobs and the locking lever

4.5.6 Unclamp the spin motor from the cross angle, move it so the socket engages the reel drive.

4.5.7 When doing a group of the same type of reels, the spin motor does not need to be moved or readjusted. The coupler is flexible enough so that the drive socket can be removed just by pulling the coupler back.

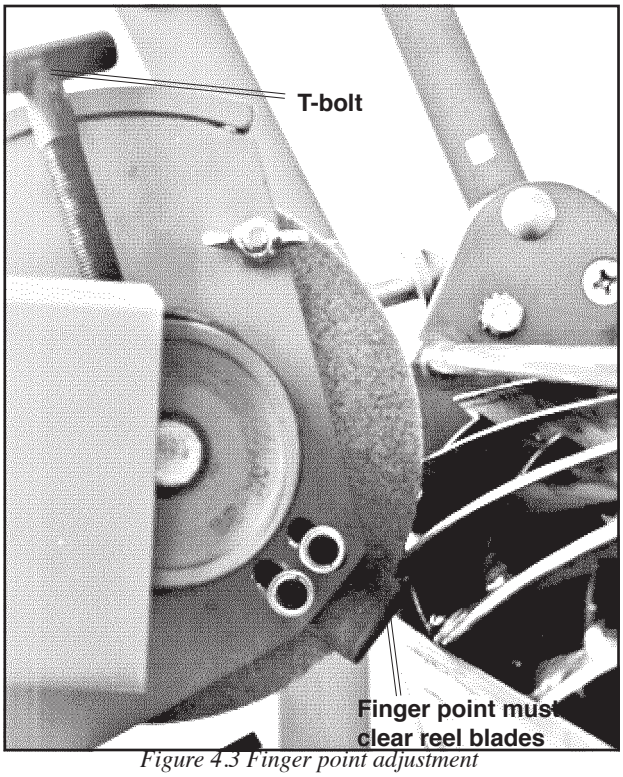


Figure 4.3 Finger point adjustment

4.6 Spin grinding

Make sure all clamps and locking knobs are tight. Loose or shifting work can cause damage or serious injury.

4.6.1 Make sure all locking knobs are tight.

4.6.2 Loosen the t-bolt which locks the wheel guard, swing the wheel guard so that the finger point for relief grinding will clear the reel mower, then tighten the t-bolt.

4.6.3 Disengage the grinding head from the pneumatic drive and move it so the grinding wheel touches the reel.

4.6.4 Unlock the grinding head horizontal adjusting screw and turn it back until the grinding wheel just misses the reel blades.

4.6.5 Make sure that the grinding wheel does not touch the reel by turning the reel by hand and moving the grinding head back and forth.

4.6.6 Engage the grinding head to the pneumatic drive and turn the carriage travel on.

4.6.7 Make sure that the grinding wheel does not touch the reel as it moves back and forth, and that it clears each end of the reel.

4.6.8 Reduce the carriage travel speed so that it is between 1-2 seconds per inch and the same in both directions.

4.6.9 When the carriage reaches the beginning turn the carriage travel off.

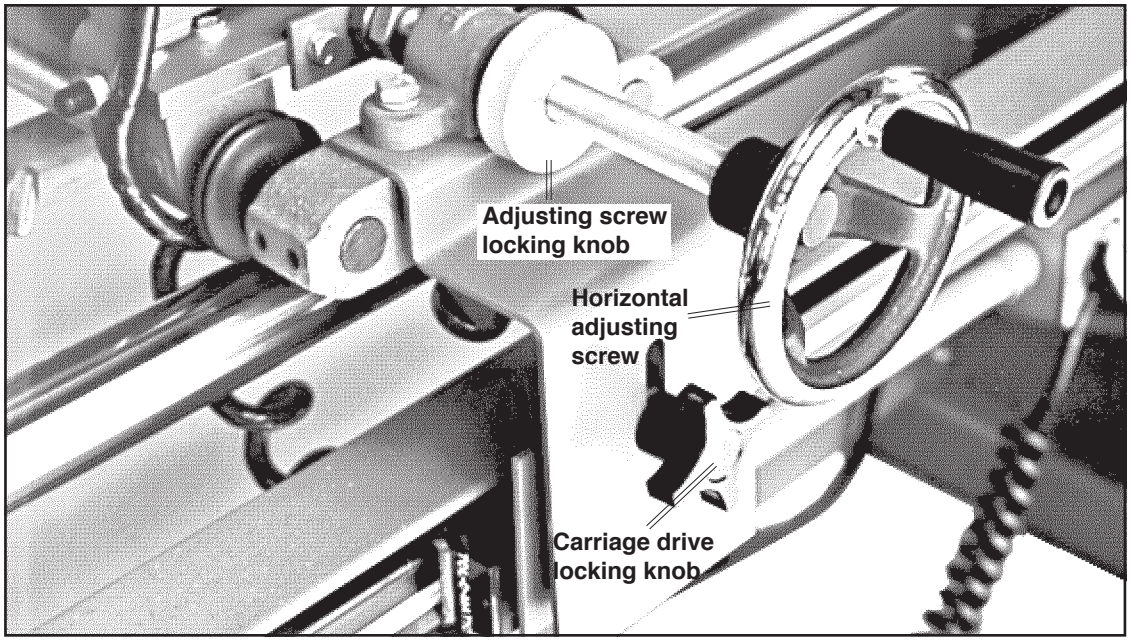


Figure 4.1 Carriage

4.6.10 Turn the spin motor on and set the control knob to 6. Make sure the reel is properly aligned and that the reel spins freely.

Always wear safety glasses and face shield when grinding! Stay clear of grinding wheel when turning grinder on!

4.6.11 Turn the grinding motor on.

4.6.12 Turn the carriage travel on. There will be a pause before the carriage begins to move.

4.6.13 Slowly feed the grinding head in with the horizontal adjustment until the grinding wheel starts to grind the reel then allow the grinding head to travel back and forth.

4.6.14 Depending on the size, type, and condition of the reel, you may wish to adjust the speed of the spin motor or the carriage travel so that you get a smooth, consistent grind.

4.6.15 Allow the grinding wheel to dust out by traversing without feeding the grinding wheel. Allow the dusting to continue until most of the sparking stops or about 5-10 strokes.

4.6.16 At the end of the last stroke

4.6.16.1 Turn the carriage travel off.

4.6.16.2 Turn the grinding motor off.

4.6.16.3 Turn the spin motor off.

4.6.16 Inspect the spin grind area of the reel blade. If more grinding is necessary, feed the grinding wheel in about $^{1}/_{16}$ to $^{1}/_{8}$ turn using the horizontal feed screw. This is about .003” to .007”. Repeat steps in Paragraphs 4.6.11 through 4.6.15.

5. GRINDING VARIATIONS

5.0 Introduction

There are different procedures you may wish to use to grind your reels which include spin then relief grinding, single relief grinding, double relief grinding , and spin grinding only. In this chapter, we will discuss the variations in the procedures required for these different types of grinding.

5.1 Spin then relief grinding

5.1.1 This procedure is basically the same as that described in chapter 4 except that you begin at Section 4.6 to the end of the chapter, then go back to Sections 4.1-4.5.

5.1.2 While spin grinding, you do not need to stop the carriage travel each time you feed in the grinding head.

5.1.3 You would continue to feed in the grinding head in periodically until you are grinding all the way across on all of the reel blades.

5.1.4 If the reel is conical, you can set the middle carriage stop 3-4 inches past where the grinding wheel grinds in order to reduce the stroke and grinding time. As the grinding wheel gets close to grinding the full length of the reduced stroke you can re-adjust the middle stop until it is no longer needed, then just let it swing out of the way.

5.2 Single and double relief grinding.

5.2.1 This procedure is basically the same as the first part of chapter 4 except that you will relief grind 100% of the blade width

5.2.2 Complete Sections 4.0 through 4.5

5.2.3 If you are going to double relief, reset the relief to 2-5° as described in section 4.1.

5.2.4 Grind each blade in order.

5.2.5 Feed the grinding wheel in slightly, then grind each blade in reverse order.

5.2.6 Without feeding the grinding wheel in grind each blade again in the correct order. This is done to ensure that the blades are all ground to the same diameter and to compensate for grinding wheel wear.

5.3 Spin grinding

5.3.1 This procedure is basically the same as that described in Chapter 4 except that you begin at section 4.7 to the end of the chapter.

5.3.2 While spin grinding, you do not need to stop the carriage travel each time you feed in the grinding head.

5.3.3 You would continue to feed in the grinding head in periodically until you are grinding all the way across on all of the reel blades.

5.3.4 If the reel is conical, you can set the middle carriage stop 3-4 inches past where the grinding wheel grinds in order to reduce the stroke and grinding time. As the grinding wheel gets close to grinding the full length of the reduce stroke you can readjust the middle stop until it is no longer needed, then just let it swing out of the way.

6. TROUBLESHOOTING

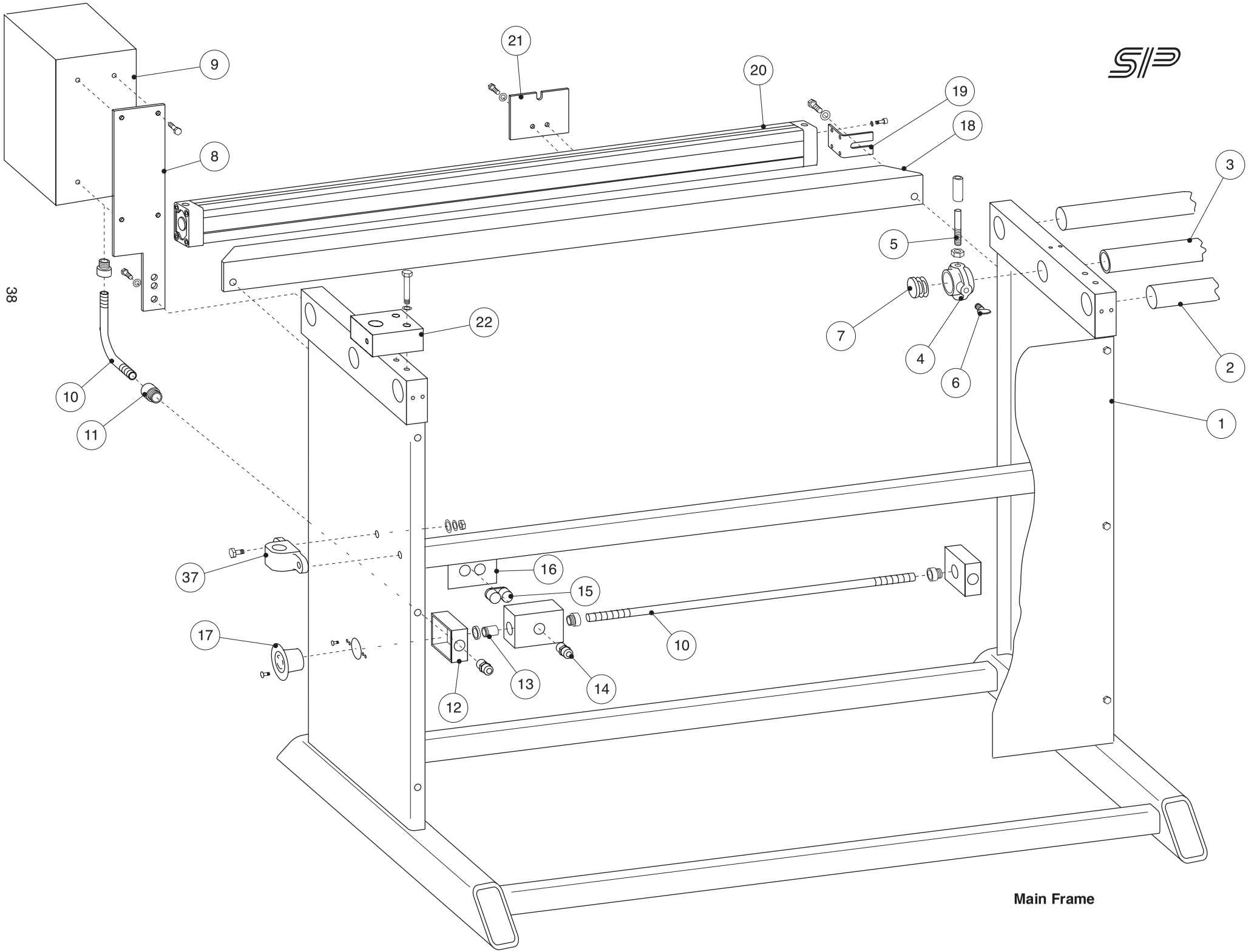
Problem	*Cause*	*Solution*
Spin motor does not come on.	Speed control off or set too low.	Increase speed control until spin motor comes on.
	Spin motor not correctly plugged in.	Make sure plug is fully engaged and twist locked.
	Spin motor fuse blown.	Replace fuse in control panel with 5 amp fast-blo fuse.
	Spin motor brushes worn.	Replace brushes.
Carriage does not move.	No air supply.	Check air supply connection.
		Open emergency air switch on filter regulator .
Carriage pauses too long (over 10 seconds) or is erratic	Air pressure too low.	Increase pressure setting at regulator to at least 50 psi.
	Track shafts and bearings are dirty.	Wipe off track shafts and bearings.
	Cylinder lubrication uneven.	Disengage grinding head. Turn carriage travel on. Turn speed up in both directions and let cycle for 1 or 2 minutes.
Grinding motor does not come on	Plugged into the wrong plug.	Plug into left plug, right plug is for accesory switch.
Grinding burns the blade	Grinding wheel is plugged	Dress grinding wheel (section 2.8).
	Carriage travel is too fast.	Reduce carriage travel speed.
	Grind is too heavy.	Back off on horizontal carriage adjustment.
Grind irregular or heavier on return stroke	Grinding head moving.	Check and tighten all bolts on grinding head.
		Adjust tension between grinding head and horizontal feed screw by tightening lock nut with set screw.
		Tighten cone point set screws at pivot point for vertical adjustment. Ensure jam nuts are tight.
	Carriage bearings are not seated properly.	Adjust bearing axles and casting so that bearings seat properly.
Grind chatter	Reel not properly clamped	Check to see that overhead clamps and chain clamps are secure.
	Reel support frame loose.	Make sure the two clamping knobs and clamping lever on both ends are tight.
		Check that all set screw and fasteners are tight.
	Finger point damaged.	Replace finger point.

7. Parts List

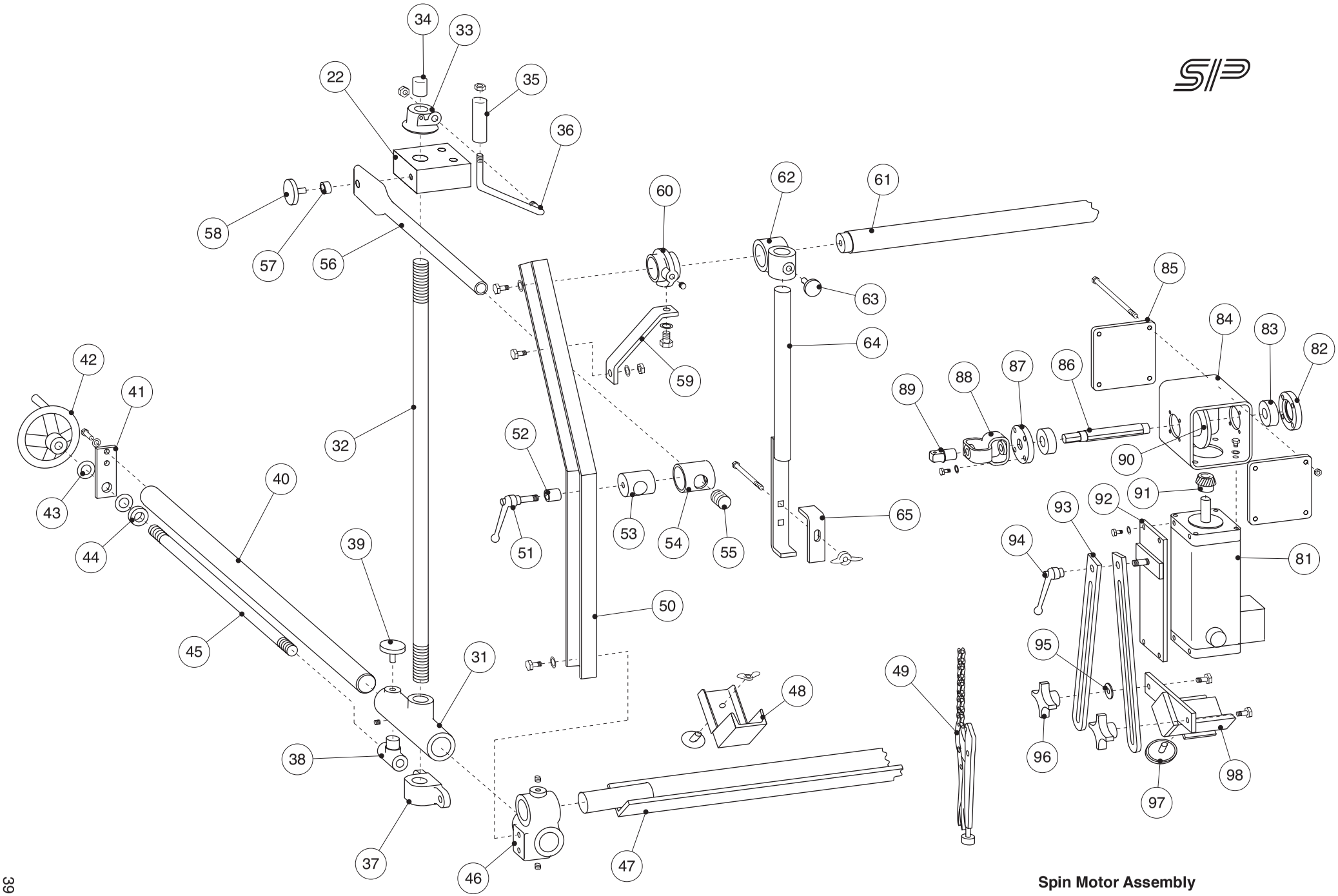
Item	Qty	Part No	Description
Main Frame			
1	1	77037-01	Reel Grinder Frame
1	6	12304-06	1/4-20x3/4 Hex Head Bolt
1	6	12204-01	1/4 Washer
1	6	12104-01	1/4-20 Lock Washer
1	6	12004-01	1/4-20 Hex Nut
2	2	71305-03	Induction Hardened Chrome Shaft
3	1	71309-02	Tie Rod
3	8	12506-03	3/8 x 16 x 3/8 set screw cup point
4	3	73053-01	JD53 Collar
5	3	73056-01	JD56 Stud
5	6	11022-03	3/8 ID Soft Vinyl Tubing
5	3	12806-01	3/8-16 Hex Jam Nut
6	3	12706-10	3/8-16 x 1 Thumb Screw
7	2	73170-02	1 Inch Pipe Plug
8	1	77051-01	Control Box Plate
8	2	12306-12	3/8-16x1-1/4 Hex Head Bolt
8	2	12106-01	3/8 Lock Washer
9	1	77062-01	Control Box
9	4	12304-10	1/4-20x1 Hex Head Bolt
9	4	12104-01	1/4-20 Lock Washer
9	4	12004-01	1/4-20 Hex Nut
10	38.5	77063-01	3/4 Blue Flex Conduit
10	22	77063-01	3/4 Blue Flex Conduit
11	4	77063-02	3/4 Blue Flex Conduit End Fitting
11	1	75104-05	3/4 Conduit Lock Nut
12	3	75104-06	Conduit Box
12	4	13001-04	6-32 x 1/2 Countersunk Screw
13	1	15014-85	3/4 NPT Close Nipple
13	1	75104-05	3/4 Conduit Lock Nut
14	2	75093-13	Strain Relief
14	2	15014-86	1/2 x 3/4 NPT Bushing
15	1	75104-10	Brown Duplex Outlet
16	1	75104-11	Cover
17	2	75104-09	Outlet
17	4	13102-04	8-32 x 1/2 Self Tapping Screw
18	1	77052-01	Cylinder Support Angle
19	2	77053-01	Cylinder Support Bracket
19	2	12305-10	5/16-18 x 1 Hex Head Bolt
19	2	12205-01	5/16 Washer
19	2	12105-01	5/16 Lock Washer
19	2	12005-01	5/16-18 Hex Nut, Coarse Thread
20	1	77013-02	Tol-O-Matic Cylinder
20	8	12403-04	10-24x1/2 Socket Head Bolt
20	8	12103-01	#10-24 Lock Washer
21	1	77054-01	Cylinder Latch Bracket
21	2	12304-04	1/4-20x1/2 Hex Head Bolt
21	2	12104-01	1/4-20 Lock Washer
22	2	77050-01	Screw Support Block
22	4	12306-20	3/8-16x2 Hex Head Bolt
22	4	12106-01	3/8 Lock Washer
Reel Support Frame			
31	1	71317-01	GD1317 Support Bracket LH
31	1	71315-01	GD1315 Support Bracket RH
31	4	12505-03	5/16-18x3/8 Set Screw, Cup Point
32	2	71313-01	GD1313 Screw
33	2	74424-01	P424 Nut
34	2	73170-03	7/8 Pipe Cap
35	2	72351-03	Crank Handle
36	2	74429-01	P429 Crank
36	4	13606-01	3/8-24 Lock Nut
37	2	71311-01	GD1311 Support
37	4	12206-01	3/8 Washer
37	4	12106-01	3/8 Lock Washer
37	4	12006-01	3/8-16 Hex Nut
38	2	74438-01	P438 Nut
38	2	12505-03	5/16-18x3/8 Set Screw, Cup Point
39	2	77008-01	Hand Knob
40	2	71321-01	GD1321 Support Shaft
40	4	12304-06	1/4-20x3/4 Hex Head Bolt
40	4	12104-01	1/4-20 Lock Washer
41	2	74446-01	P446 Link
42	2	74230-02	JD94 Hand Wheel
43	4	75052-01	PB52 Washer
44	2	74027-01	P27 Collar 5/8”
45	2	74439-01	P439 Screw
46	2	71323-01	GD1323 Bracket
46	2	12506-03	3/8 x 16 x 3/8 set screw cup point
46	4	12306-06	3/8-16x3/4 Hex Head Bolt
46	4	12106-01	3/8 Lock Washer
47	1	71325-01	GD1325 Support
48	2	71418-01	GD1418 V-Support
48	4	13405-10	5/16-18 x 1 Fender Bolt
48	4	13305-01	5/16-18 Wing Nut
49	2	77060-01	Chain Vice Grips
50	1	71327-01	GD1327 Right Support Bracket
50	1	71327-02	Left Support Bracket
51	2	77048-01	Locking Screw
52	2	71438-02	5/8 Inch Spacer
53	2	77047-02	Clamp
54	2	77047-01	Clamp Sleeve
55	2	73170-01	Pipe Plug
56	2	77049-01	Clamp Brace
57	2	71438-03	1/4 Inch Spacer
58	2	77008-01	Hand Knob
59	2	77046-01	Overhead Support Gusset
59	4	12306-06	3/8-16x3/4 Hex Head Bolt
59	4	12106-01	3/8 Lock Washer
59	2	12006-01	3/8-16 Hex Nut
60	2	73053-01	JD53 Collar
60	2	12506-03	3/8 x 16 x 3/8 set screw cup point
61	1	71329-01	GD1329 Tie Bar
62	2	71367-02	Knuckle
63	4	77008-01	Hand Knob
64	2	71335-02	Clamp Bar
65	2	71337-01	GD1337 Clamp
65	2	71337-03	Clamp
65	2	71337-02	GD1338 Clamp
65	2	13205-20	5/16-18 x 2 Cariage Bolt
65	2	13305-01	5/16-18 Wing Nut

Item	Qty	Part No	Description
Spin Motor Assembly			
81	1	77040-01	Spin Motor
81	4	12305-50	5/16 x 5 Hex Head Bolt
81	0.5	75093-12	Coiled Cord
81	4	12005-01	5/16-18 Hex Nut, Coarse Thread
81	1	75093-13	Strain Relief
81	1	75104-07	Connector Boot
81	1	75104-08	Twist Plug
81	1	75093-10	Ring Wire Connector
81	2	75093-07	Blue Wire Nut
82	1	77044-01	Bearing Cap
82	4	12304-06	1/4-20x3/4 Hex Head Bolt
82	4	12104-01	1/4-20 Lock Washer
83	2	16129-02	Bearing 6202-2RS
84	1	77041-01	Gear Housing
84	4	12304-06	1/4-20x3/4 Hex Head Bolt
85	2	77042-01	Gear Housing Cap
85	4	12305-50	1/4-20x5 Hex Head Bolt
85	4	12104-01	1/4-20 Lock Washer
85	4	12004-01	1/4-20 Hex Head Bolt
86	1	77039-01	Spin Motor Shaft
87	1	77044-02	Bearing Cap
88	1	77076-01	Flexible Coupler
89	1	77075-01	Drive Shaft
90	1	77043-01	Gear
90	2	12504-03	1/4-20x3/8 Set Screw, Cup Point
91	1	77043-02	Pinion
92	1	77045-01	Spin Motor Mounting Plate
92	4	12304-06	1/4-20x3/4 Hex Head Bolt
92	4	12104-01	1/4-20 Lock Washer
93	2	77059-01	Spin Motor Support
94	1	77048-02	Locking Handle
95	1	71438-03	1/4 Inch Spacer
96	2	77030-01	Locking Knob, 3/8-16 Thru Hole
96	2	12306-10	3/8-16x1 Hex Head Bolt
97	1	77008-01	Hand Knob
98	1	77058-01	Spin Motor Bracket
Grinding Head			
101	1	71343-01	GD1343 Mounting
102	2	71345-01	GD1345 Shaft
103	1	71339-01	GD1339 RH Mounting
103	1	71339-02	GD1341 LH Mounting
103	14	12505-03	5/16-18x3/8 Set Screw, Cup Point
104	1	71353-01	Dust Guard Angle
104	2	12504-06	1/4-20x3/4 Set Screw, Cup Point
104	2	12004-01	1/4-20 Hex Nut
104	2	12104-01	1/4-20 Lock Washer
105	4	71351-02	5/8 Rubber Grommet
105	8	15023-04	2 In Wire Tie
106	4	71351-01	GD1351 Sleeve
107	4	16350-01	Bushing 3/4 ID x 1 OD x1-3/4 Long
108	4	71347-02	GD1347 Bearing Block
108	8	12304-10	1/4-20x1 Hex Head Bolt
108	8	12104-01	1/4-20 Lock Washer
109	2	71352-02	Spacer
110	6	73076-02	Axle
111	6	16129-00	Bearing
112	1	77056-01	Latch Pin
113	1	77055-01	Carriage Latch Bracket
114	1	77030-04	1/2-13 Blind Hole Knob
115	1	71392-01	GD1392 Support
115	2	12305-10	5/16-18 x 1 Hex Head Bolt
115	2	12105-01	5/16 Lock Washer
116	1	71355-01	GD1355 Bearing Plate
117	1	71389-01	GD1389 Carriage Lock
117	2	12304-06	1/4-20x3/4 Hex Head Bolt
117	2	12104-01	1/4-20 Lock Washer
118	1	15011-01	5/8” Snap Ring
119	1	72365-01	Thrust Bearing, 5/8 Bore
120	1	71394-01	Carriage Lock Nut
120	1	12503-02	10-24 x 1/4 Cup Point Set Screw
121	1	71391-01	GD1391 Adjusting Screw
122	1	71354-01	GD1354 Dust Guard
122	2	12304-06	1/4-20x3/4 Hex Head Bolt
122	2	12004-01	1/4-20 Hex Nut
122	2	12104-01	1/4-20 Lock Washer
122	2	12204-01	1/4 Washer
123	1	71393-01	GD1393 Lock Nut
124	1	74230-02	P230 Hand Wheel
125	1	71356-01	GD1356 Motor Plate
125	2	12606-10	3/8-16x1 Set Screw, Cone Point
125	2	12806-01	3/8-16 Hex Jam Nut
126	1	71414-01	Belt Guard Bracket
127	1	71358-01	GD1358 Support
127	2	12304-06	1/4-20x3/4 Hex Head Bolt
127	2	12104-01	1/4-20 Lock Washer
127	1	12506-03	3/8 x 16 x 3/8 set screw cup point
128	1	76177-03	3/4 Hp 60 Hz TEFC
128	1	75093-12	Coiled Cord
128	1	75093-13	Strain Relief
128	2	75093-07	Wire Nut, Small Blue
128	1	75093-08	Wire Nut, Medium Yellow
129	1	71409-03	3 x 5/8 Pulley
130	1	73050-32	32 inch V-Belt
131	2	13506-01	3/8-16 Coupler Nut
131	3	12306-10	3/8-16x1 Hex Head Bolt
131	4	12106-01	3/8 Lock Washer
132	1	71413-01	GD1413 Guard
133	1	73056-02	Stud
133	1	12006-01	3/8-16 Hex Nut
134	1	77009-01	3/8-16 Nylon Acorn Nut
135	1	71438-01	3 Inch Spacer
136	1	71436-01	GD1436 Screw
137	1	77030-01	Locking Knob, 3/8-16 Thru Hole
138	1	77030-02	Locking Knob, 3/8-16 Blind Hole
138	1	12806-01	3/8-16 Hex Jam Nut
139	1	71360-01	GD1360 Shaft
140	1	71409-04	3 x 3/4 Pulley
141	1	16388-01	R388 Bearing
142	1	76386-01	R386A Bearing Housing
142	1	12505-03	5/16-18x3/8 Set Screw, Cup Point
142	1	12506-03	3/8 x 16 x 3/8 set screw cup point
143	1	71381-01	GD1381 Guard
143	1	13306-01	3/8-16 Wing Nut
144	1	74256-01	P256C Finger Point
144	2	12304-04	1/4-20x1/2 Hex Head Bolt
144	4	71438-04	1/4 x 1/4 Spacer
145	1	75055-01	PB55 Clamp Screw, 1/2-13 Thread
145	0.25	11015-02	1/4 Dia Bronze Bar
146	1	75080-01	PB80 Hub
146	1	12506-02	3/8-16x1/4 Set Screw, Cup Point
147	1	79135-01	W135 Grinding Wheel, 7x1/2x1-1/4
148	1	75010-01	PB10 Nut
148	1	75011-01	PB11 U-Wrench

Item	Qty	Part No	Description
149	1	71382-01	Wheel Guard Plate
149	3	12003-02	10-24 Nut
149	3	12103-01	#10-24 Lock Washer
150	1	77069-01	Eccentric Stop
150	2	13304-01	1/4-20 Wing Nut
150	2	12003-01	#10-24 Hex Nut
151	1	77066-01	Indexer Bar
151	2	12403-04	10-24x1/2 Socket Head Bolt
151	2	12203-01	#10 Washer
152	1	72351-02	JD92 Knob
152	1	13004-04	1/4-20 x 1/2 Countersunk Screw
153	1	77070-01	Extension Spring
154	2	77068-01	Indexer Stud
154	3	12004-01	1/4-20 Hex Nut
155	1	77067-01	Indexer Clamp
Set Up Gauge			
161	1	77071-01	Set Up Gauge Bracket
162	2	12304-04	1/4-20x1/2 Hex Head Bolt
162	3	77074-01	Knob Handle
163	1	77072-02	Indicator Block
164	1	77021-01	Dial Indicator
164	1	12304-06	1/4-20x3/4 Hex Head Bolt
164	1	12104-01	1/4-20 Lock Washer
165	1	72351-01	J351 Plastic Ball Knob
166	1	77016-01	Gauge Spring
167	1	77072-01	Stop Block
168	1	77073-01	Set Up Gauge Plunger
169	1	12404-06	1/4-20x3/4 Socket Head Bolt
169	1	71438-04	1/4 x 1/4 Spacer
Diamond Dresser			
181	1	74388-01	P388 Rod End
181	3	12806-01	3/8-16 Hex Jam Nut
182	1	16316-13	J316X Bearing
183	1	74373-01	P373 Stud
184	1	74374-01	P374 Holder
185	1	79180-02	W180T Diamond Dresser
186	1	12704-10	1/4-20x1 Thumb Screw
187	1	74413-01	Link
Control Box Electrical			
201	1	75104-12	Locking Mushroom Push-button
201	1	75104-13	NC Slow Make Contact Block
202	4	75093-05	Curvette Rocker Switch
202	4	75093-14	Scotch Lock Quick Disconnect
202	6	75093-15	.25 Quick Disconnect
203	1	77040-02	Spin Motor Controller
203	5	75093-16	.187 Quick Disconnect
203	1.25	11008-04	Steel Rod
204	1	75104-14	Panel Mount Fuse Holder
204	1	75104-15	5 Amp Fast Blow Fuse
205	12	75092-02	20 Ga Black Wire
205	12	75092-03	20 Gauge Red Wire
205	12	75092-06	20 Gauge Green Wire
206	48	75092-12	18 Gauge Wire Black
206	48	75092-13	18 Gauge Wire Red
206	48	75092-14	18 Gauge Wire Yellow
206	48	75092-16	18 Gauge Wire Green
206	48	75092-18	18 Gauge Wire Orange
206	48	75092-21	16 Gauge Wire White
206	48	75092-25	16 Gauge Wire Blue
207	10	75092-14	18 Gauge Wire Yellow and Black
207	3	75092-13	18 Gauge Wire Red and Black
207	3	75092-12	18 Gauge Wire Black
208	54	75092-13	18 Gauge Wire Red
208	54	75092-14	18 Gauge Wire Yellow
208	54	75092-16	18 Gauge Wire Green
209	12	75092-16	18 Gauge Wire Green
210	1	75093-07	Blue Wire Nut
211	1	75093-17	Heavy Duty Power Cord
Control Box Pneumatic			
221	2	15014-41	1/4 x 1/8NPT Male Connector
222	6	15014-21	1/4 x 1/8NPT Male Swivel Elbow
223	2	15014-81	1/8 NPT Female Pipe Tee
224	5	15014-75	1/8 x 1/8NPT Hose Barb
225	2	15020-01	Flow Control Valve
226	1	15016-02	Air Pilot Valve
227	1	15014-45	1/4 x 1/4NPT Male Connector
228	9	15014-71	1/8 x 10-32 Hose Barb
229	2	15017-02	3 Way Valve
230	1	15017-03	Valve
231	1	15017-04	Acrylic Sub Base
232	1	15021-03	Electric On-Off Valve
233	3	15014-11	Union Tee, 1/4 Tube
234	1	15019-01	Filter Regulator and Shut Off Valve
235	5	15014-25	1/4 x 1/4NPT Male Elbow Swivel
236	36	15022-04	1/4 OD Polyethylene Tubing, Clear
237	36	15022-05	1/4 OD Polyethylene Tubing, Black
238	12	15022-11	1/8 OD Urethane Tubing, Blue
239	12	15022-12	1/8 OD Urethane Tubing, Orange
239	3	71351-03	1/4 Rubber Grommet
239	3	15023-01	1/2” Cable Clip
239	72	15023-02	Tubing Protector
239	10	15023-03	1-1/4 Wire Tie

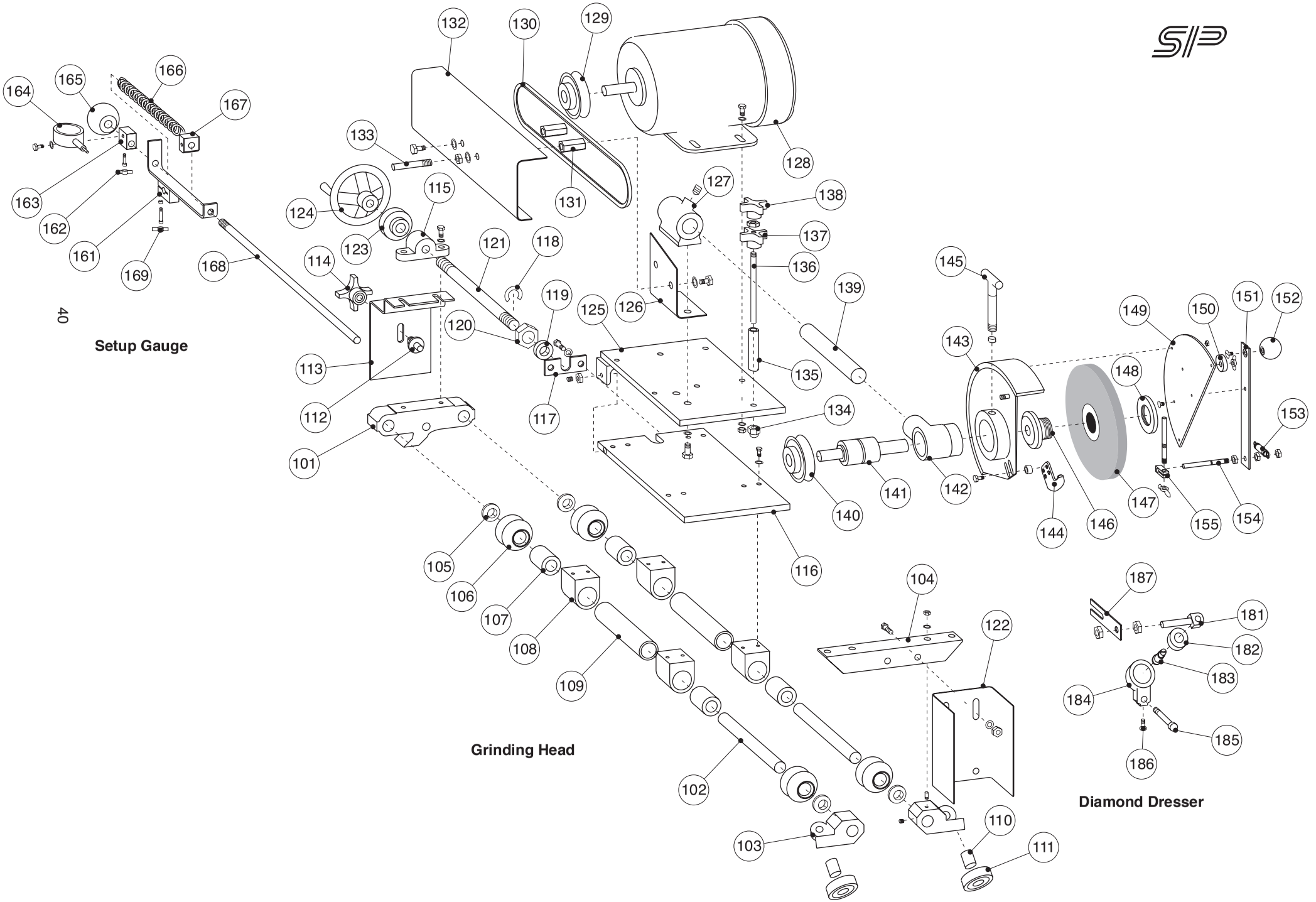


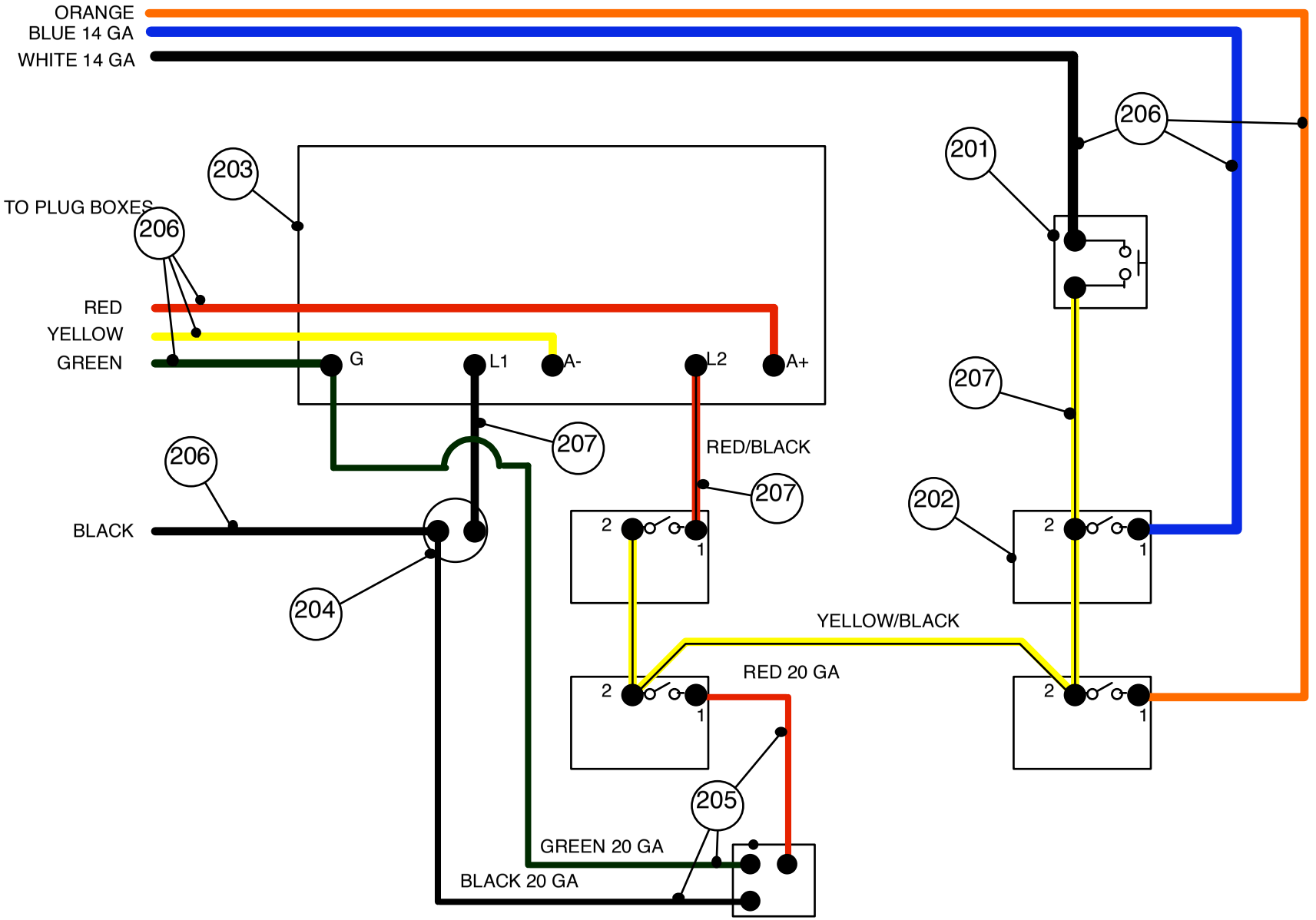
Main Frame



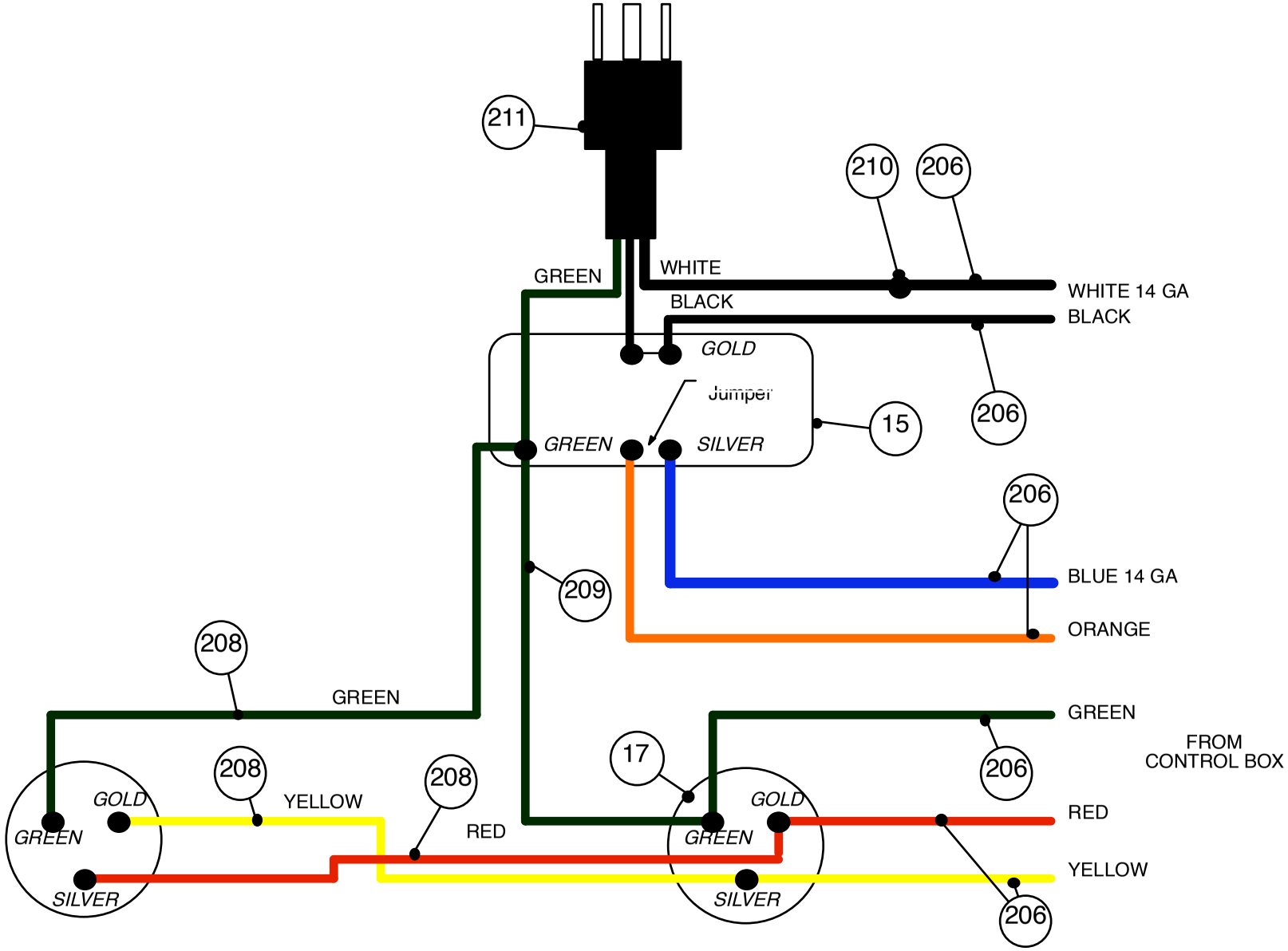
Reel Support Frame

Spin Motor Assembly

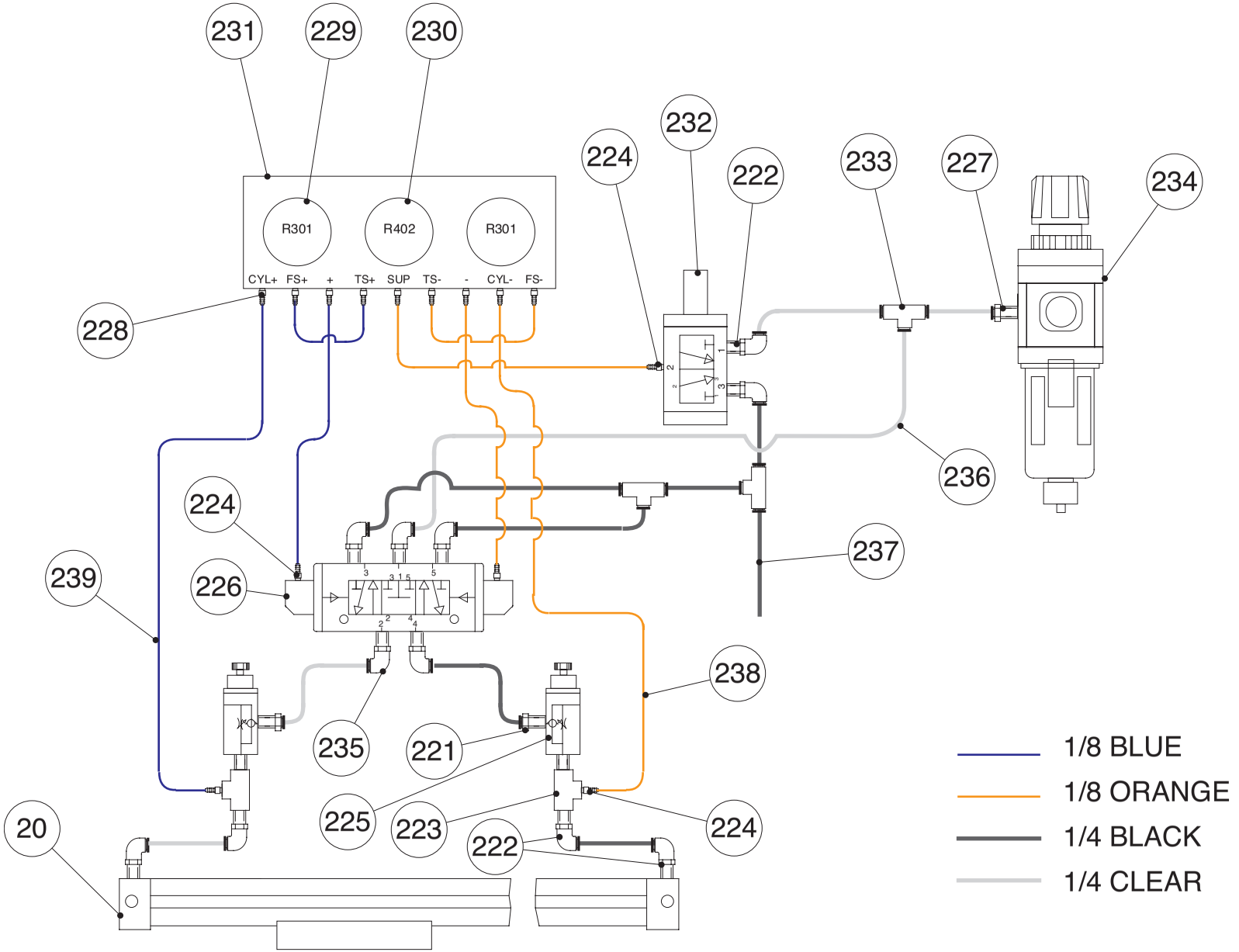

Setup Gauge
Grinding Head
Diamond Dresser



Control Box Wiring



Frame Wiring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CYL+ FS+ + TS+ SUP TS- - CYL- FS-
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221
225
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222
224
20
1/8 BLUE
1/8 ORANGE
1/4 BLACK
1/4 CLEAR

Pneumatics