

DRILL GRINDER

91000



Brochure Includes:

- **Set-up Instructions**
- **Operating Instructions**
- **Parts List**
- **Fundamentals of Drill Sharpening**

Patent
3,952,459



Accurately



Sharpens most drills bits.

Now, with this one low-cost, simple machine, several different types of drill bits can be quickly sharpened: two, three and four fluted drill bits, Flat Bottom and Core Drills. Precision work!

Quickly

With just a little experience, anyone can become an expert.

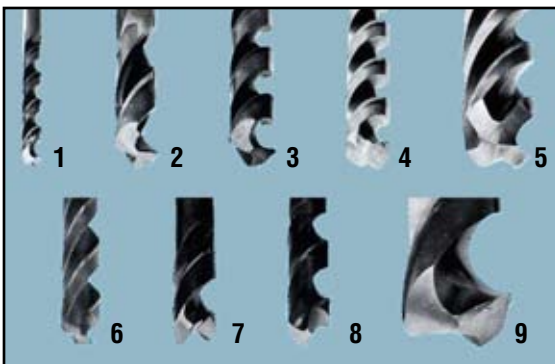
It takes only a few minutes to set up and have ready for operation this Lisle 91000 Drill Grinder. A few minutes reading ALL OF THE OPERATING INSTRUCTIONS will ensure the right start. A little practice and most every machine shop can be doing all its own sharpening the first day. Comes complete!

Economically

Without a major investment, every plant can own its own Drill Grinder.

The cost of commercial sharpening (to say nothing of the time it takes to get the work done commercially) plus the rapid increases in the cost of new bits makes owning and operating a Lisle 9100 Drill Grinder a practical, money-making investment.

Sharpens Drills



From 1/8" up to 1 1/4" in size.

The Lisle 9100 can handle drill bits as small as 1/8" up to and including 1 1/4". This machine will properly sharpen bits with straight or tapered shanks. Correct tolerances for heel clearance, chisel or web angle, and cutting lip angle are locked into position if properly set-up. Adjustments for various types and sizes of bits are quickly and easily made. No guess work or estimates.

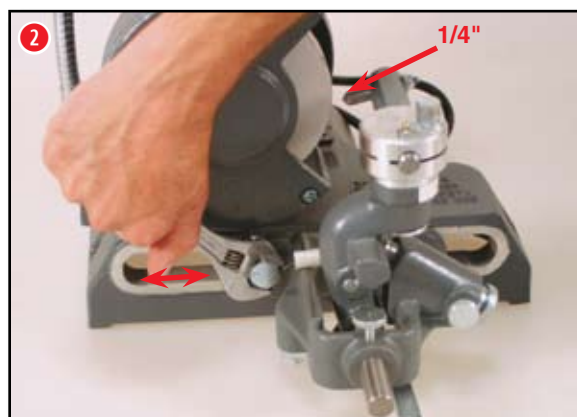
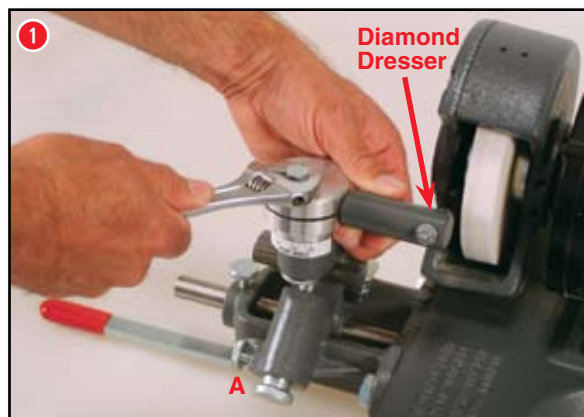
1. 1/8" Standard Drill, **2.** 1/4" Low helix Drill, **3.** Standard 1/2" Drill, **4.** 1/4" High helix Drill, **5.** 4 Fluted Core Drill, **6.** 3 Fluted Core Drill, **7.** Flat Bottom Drill, **8.** Standard 1/4" Drill, **9.** 1 1/4" Standard 2 Fluted Drill.

The Lisle Drill Grinder 91000 is assembled at the factory to such an extent that it takes only minutes to set-up and be ready to operate. HOWEVER, it will pay to read through the set-up and operating instructions on a step by step basis prior to starting. This will help assure success on the first try and will also make the set-up easier and avoid the necessity of re-doing any work.

EACH PHOTOGRAPH IN THIS BROCHURE IS NUMBERED FOR QUICK REFERENCE TO SPECIFIC PROCEDURES, ASSEMBLIES, PARTS AND ADJUSTMENTS WHICH ARE MEANINGFUL TO BOTH SET-UP AND OPERATION.



Set-Up Instructions



1. If possible, bolt Drill Grinder to left hand corner of work bench.
2. Install protective plastic shield with screws provided. Helps meet OSHA standards.
3. **FOR FEED BRACKET ADJUSTMENT:** (See photo 1) First, release the feed screw (A) until the rocker arm is in the full relaxed position. Align the marks on the diamond dresser and split bushing before tightening in place. Slide the feed bracket assembly (See photo 2) until the diamond is approximately 1/4" from the stone. Tighten feed bracket in place.
4. **TO DRESS THE GRINDING WHEEL:** Plug motor into a three wire ground outlet and turn motor on.
CAUTION! When dressing the stone or drill sharpening it is recommended that eye protection be worn to prevent personal injury. Advance feed screw until the diamond just touches the grinding wheel. Loosen the cross-feed lock screw (See photo 14) and move the cross-feed lever to work the diamond back and forth across the grinding wheel.

NOTE: As the grinding wheel becomes unevenly worn from use, regular dressing will assure quality sharpening. Also, regular adjustment of the feed bracket to the reduced size of grinding wheel is a necessity. (See item 3)

If the grinding wheel housing becomes loose, tighten the **two** (X) set screws. (See Photo 3)

AFTER MASTERING SET-UP FOR STANDARD TWO FLUTED DRILLS, APPLY THESE VARIATIONS FOR OTHER TYPES DRILLS.

Sharpening Special Purpose Drills

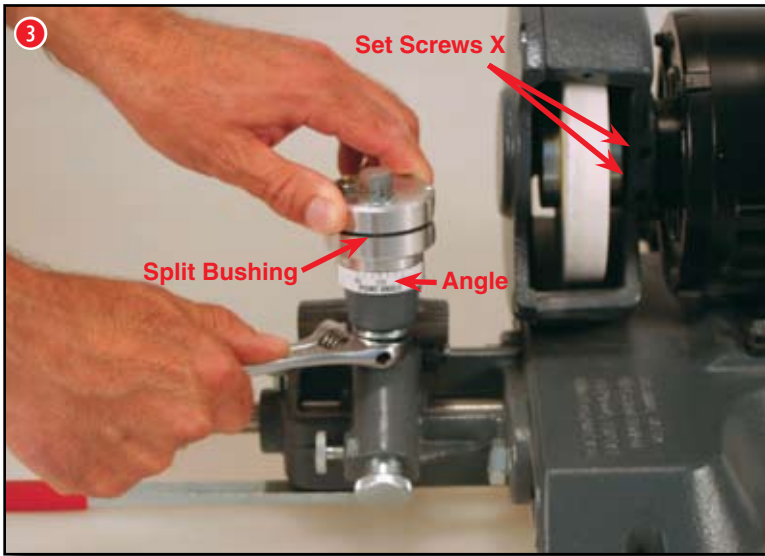
(See Photo 13)

Flat Bottom (180 degree included Angle) -- First, split bushing should be set at 180 degrees (See operating instructions "I"). Loosen the two bolts holding the feed bracket and move it as far forward as possible. Position the drill in the drill holder as you would for grinding a standard drill point. Place the drill holder in the split bushing and advance the feed screw. As the drill approaches the stone, move the cross-feed lock screw. Grind the first lip in the normal manner. Set the stop sleeve, back up the feed screw, rotate the drill and grind the second lip.

Core Drill (3 Fluted) -- Position drill in holder with first lip parallel to the center line of the "V" of the drill holder. **Do not use set-up line on stop lip for this grind.** Move stop lip to margin of drill and tighten. Proceed to grind first lip as you would on a two fluted drill. Set the stop sleeve, back up the feed screw, rotate the drill and grind the second lip. Continue until all cutting lips have been ground.

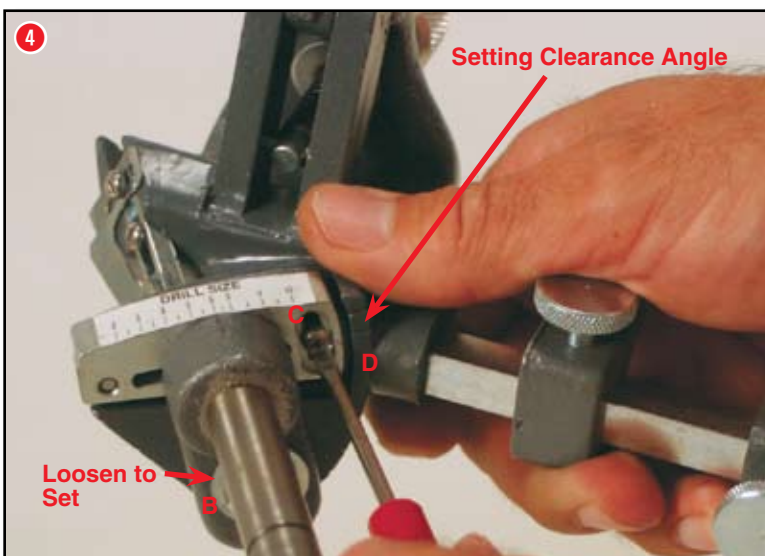
Core Drill (4 Fluted) -- Position drill in holder with the first lip parallel to the center line of the "V" (same as 3 fluted) (See photo 9). **Do not use set-up line on stop lip for this grind.** Move stop lip to margin of drill and tighten. NOTE: The grinding procedure on this drill is different because of the closeness of the cutting lips. Place drill holder in split-bushing and position the holder so that the axis of the drill is at an angle of about 10 degrees below the horizontal (about 2" drop at the end of the drill holder shaft) before tightening in place (See photo 13). Advance the feed screw until first lip just touches the grinding stone. Then with quick motions, advance the feed screw slightly and back it off to avoid burning. This can best be done by rocking the feed screw back and forth. Continue until the first lip is ground, then quickly tighten the stop sleeve and back off the feed screw. Examine the clearance angle on the lip which was just sharpened. If the clearance angle looks acceptable, then proceed to grind the remaining lips in the same manner. If the clearance angle is not acceptable, then the angle of the drill with the horizontal will have to be changed. Decreasing the angle will decrease the clearance and increasing the angle will increase the clearance.

Operating Instructions

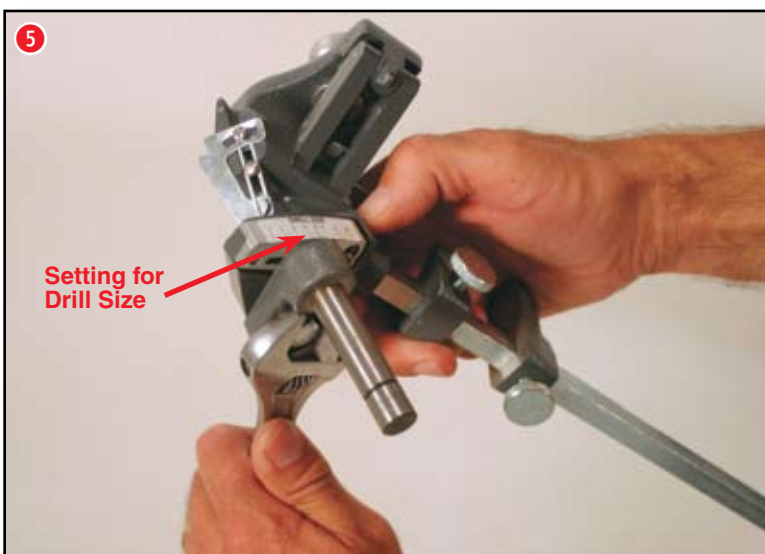


I. To obtain desired point angle:

The split bushing on the rocker arm is calibrated in degrees and can be adjusted to sharpen drills at various included point angles. Loosen bolt under rocker arm which holds the split bushing in place and set at desired angle (normally 118 degrees). Tighten bolt (See photo 3).



II. To set clearance angle: Loosen bolt holding the pivot shaft (B). Then loosen the screw holding the lip clearance adjuster (C) and align the mark with the desired clearance angle (D) (See photo 4). The center mark gives 12 degrees clearance and is best for average drilling. The top position gives 18 degrees and the bottom position gives 6 degrees clearance. Now, tighten the screw (But not the bolt).

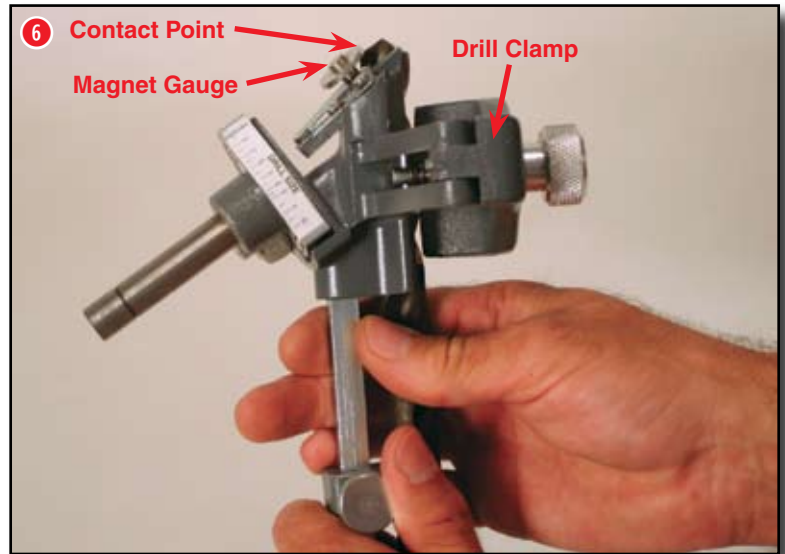


III. To set for drill size: Align the mark on the pivot shaft assembly (See photo 5) with the mark corresponding to the diameter of the drill to be sharpened. Now, tighten the assembly in place.

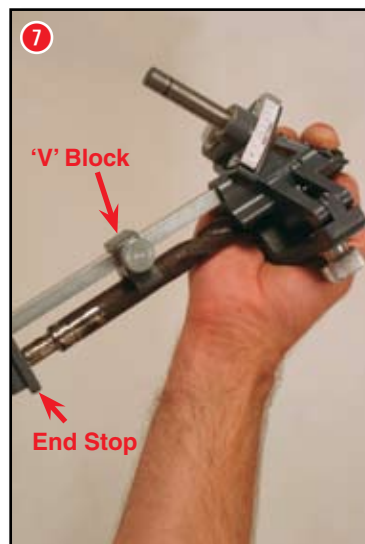


Operating Instructions

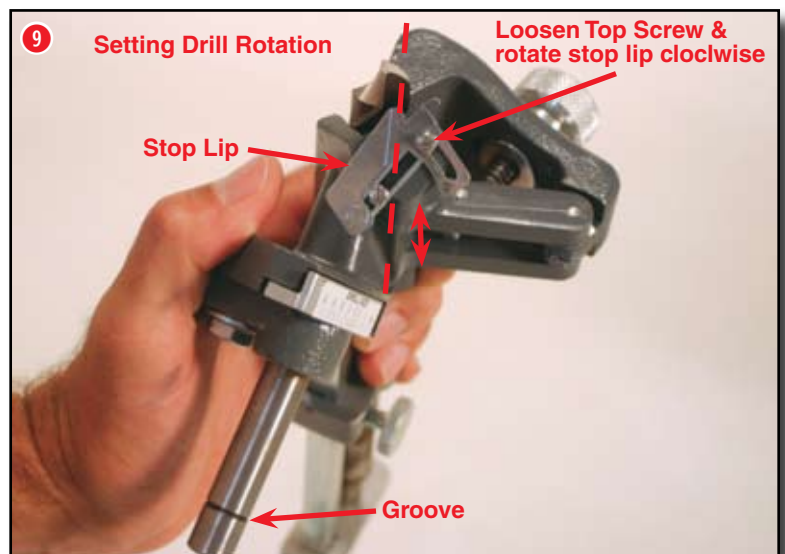
IV. To clamp drill in drill holder: First, place magnet extension gauge on stop lip as shown (See photo 6). The magnet gauge is made so that one side of the magnet extends $\frac{3}{32}$ of an inch and the other side $\frac{1}{8}$ of an inch. Use the shorter $\frac{3}{32}$ inch side for drills up to $\frac{3}{8}$ inch diameter and the longer $\frac{1}{8}$ inch side for drills larger than $\frac{3}{8}$ inch diameter. Place drill in clamp and move the drill toward the magnet gauge until the edge of the cutting lip just touches the bottom of the gauge. Tighten drill clamp.



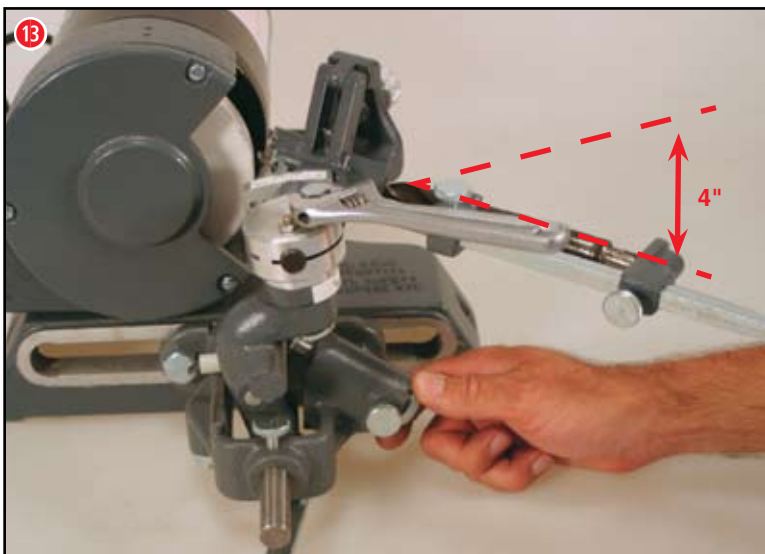
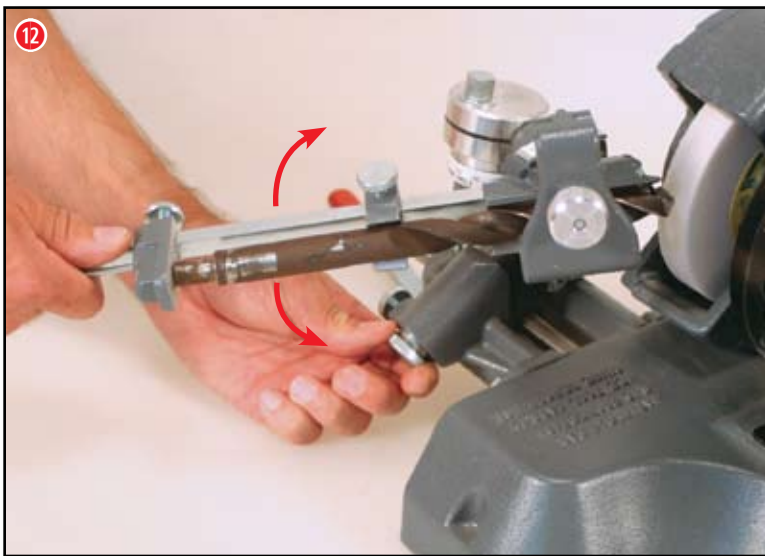
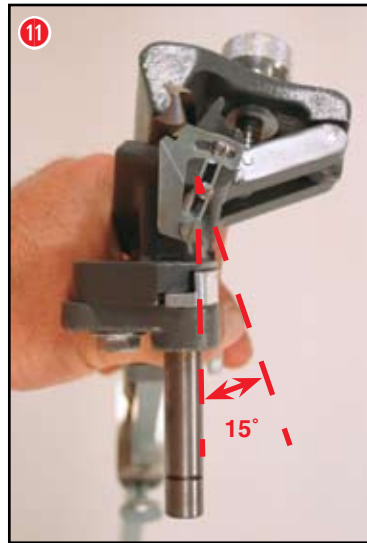
V. To adjust end-stop and V-block: Slide end-stop along the square shaft until it rests firmly against the drill. Then move the V-block so that it helps support the shank of the drill (See photo 7). The small rod on the end-stop is used when sharpening short drills by reversing end-stop on square shaft (See photo 8).



VI. To set drill rotation: (See photo 9) Loosen the top screw (in the curved slot) on the stop lip and turn clockwise as far as it will pivot. Then loosen the drill clamp just enough so that the drill may be rotated. Turn the drill until the first cutting lip is parallel with the scribe line (See dotted line) on the stop lip. The cutting lip and scribe line will not line up, but will be parallel. Tighten drill clamp. Second screw is for height adjustment depending on size of drill.



Operating Instructions



VII. To set stop lip: Move the stop lip counter clockwise so that the edge just catches the margin of the drill flute. Note that the stop lip can move up and down as well as in and out. Now, tighten stop lip in place (See photo 10). If you have done everything correctly, the cutting lip should be at a 15° angle from the pivot shaft as shown in picture 11.

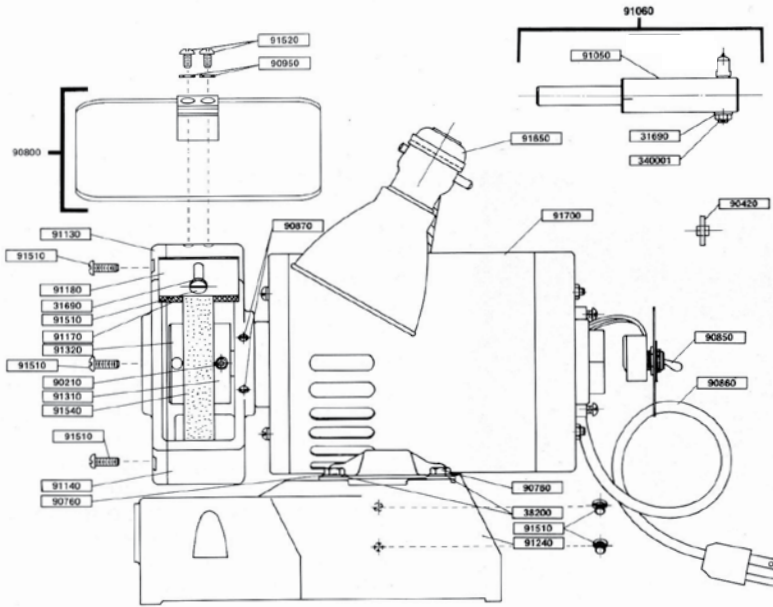
VIII. To mount drill holder in split bushing: Slide drill holder assembly into split bushing (just as you did the diamond dresser) (See photo 1) until groove in pivot shaft engages the spring loaded plunger. Tighten the bushing just enough so that the drill holder assembly can freely pivot in the bushing.

IX. To sharpen the first lip of the drill: Loosen stop sleeve lock screw before sharpening first lip so that the stop sleeve can slide back against the feed screw (See photo 14). Grasp the drill holder with your right hand and move the drill up and down (approximately two times per second) as you advance the feed screw with your left hand (See photo 12). Slowly advance the feed screw until the first lip is sharpened.

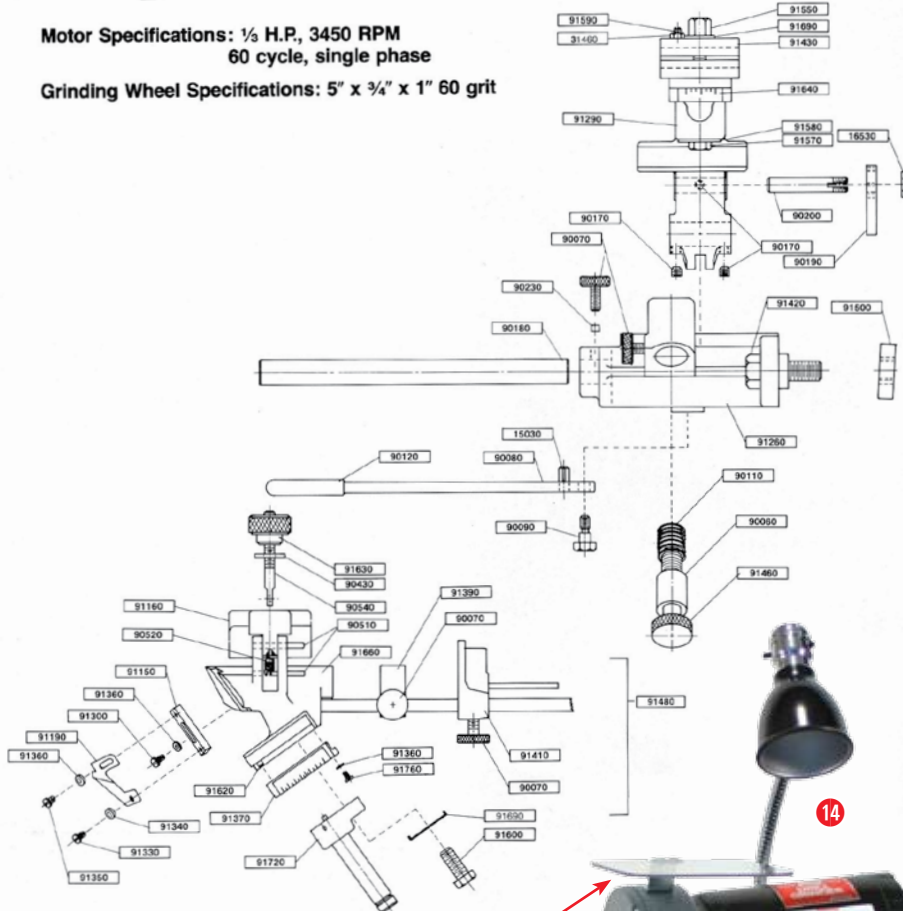
X. To set the stop sleeve: Tighten stop sleeve lock screw after sharpening the first lip. By doing this, you will be able to grind the second drill lip exactly the same as the first lip. Turn the feed screw again to be sure that there is no slack between the feed screw and the stop sleeve. Move the drill holder up and down a few more times in case any movement has taken place.

XI. Preparing for second or additional lips: Back off the feed screw a few turns and shut off the motor. Loosen the drill clamp slightly and rotate the drill until the second lip is tight against the stop lip. Keep the drill tight against the stop lip and end stop as you retighten the drill clamp.

XII. To sharpen second lip: Advance feed screw following same procedure as in "Paragraph IX: To sharpen the first lip of the drill"; until stopped by the pre-set stop sleeve. Proceed with all lips in the same manner. Always turn off motor to remove drill or drill holder assembly.

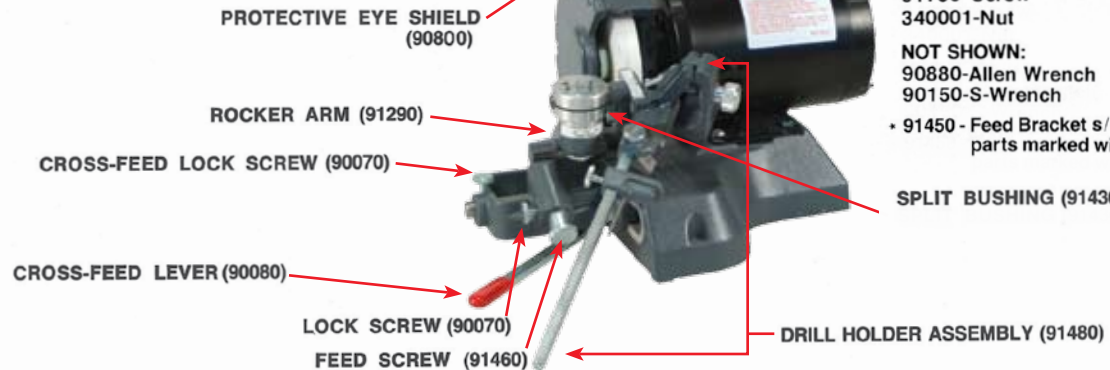


Motor Specifications: 1/2 H.P., 3450 RPM
60 cycle, single phase
Grinding Wheel Specifications: 5" x 3/4" x 1" 60 grit



DRILL GRINDER PARTS LIST

- * 15030-Roll Pin
 - * 16530-Nut
 - * 31460-Nut
 - 31690-Washer
 - 38200-Washer
 - * 90060-Stop Sleeve
 - * 90070-Lock Screw
 - * 90080-Feed Lever
 - * 90090-Shoulder Bolt
 - * 90110-Spring
 - * 90120-Feed Lever Grip
 - * 90170-Set Screw
 - * 90180-Lower Slide Bar
 - * 90190-Return Spring
 - * 90200-Slotted Shaft
 - 90210-Set Screw
 - * 90230-Brass Slug
 - 90420-Magnet Gage
 - 90430-Washer
 - 90510-Drive Pin
 - 90520-Spring
 - 90540-Clamp Screw
 - 90760-Bolt
 - 90800-Shield Assembly
 - 90850-Motor Switch
 - 90860-Cord & Plug
 - 90870-Set Screw
 - 90950-Washer
 - 91050-Diamond Dresser Holder
 - 91060-Diamond Dresser Assembly
 - 91130-Guard Cover
 - 91140-Guard Housing
 - 91150-Stop Lip Block
 - 91160-Drill Clamp
 - 91170-Spark Stripper
 - 91180-Spark Stripper Plate
 - 91190-Adjustable Stop Lip
 - 91240-Base
 - * 91260-Feed Bracket
 - * 91290-Rocker Arm
 - 91300-Screw
 - 91310-Grinding Wheel Adapter
 - 91320-Grinding Wheel Adapter Nut
 - 91330-Pivot Screw
 - 91340-Curved Spring Washer
 - 91350-Screw
 - 91360-Washer
 - 91370-Lip Clearance Adjuster
 - 91390-"V" Block
 - 91410-End Stop
 - 91420-Bolt
 - * 91430-Split Bushing
 - * 91460-Feed Screw
 - 91480-Drill Holder Assembly
 - 91500-Feed Bracket Plate
 - 91510-Screw
 - 91520-Screw
 - 91540-Grinding Wheel
 - * 91550-Bolt
 - * 91570-Bolt
 - * 91580-Washer
 - * 91590-Screw
 - 91600-Bolt
 - 91620-Dowel Pin
 - 91630-Knob
 - * 91640-Point Angle Name Plate
 - 91650-Flexible Arm Light
 - 91660-"V" Head & Shaft s/a
 - * 91690-Washer
 - 91700-Motor s/a
 - 91720-Drill Size Arm & Shaft Assembly
 - 91760-Screw
 - 340001-Nut
- NOT SHOWN:**
90880-Allen Wrench
90150-S-Wrench
- * 91450 - Feed Bracket s/a contains parts marked with *



Fundamentals of Drill Sharpening

Before sharpening a drill bit, it is important that one be familiar with basic drill terminology and the fundamentals of drill sharpening. Figure 1 below shows some of the basic terminology related to a standard twist drill.

A properly sharpened drill is one where the cutting edges (lips) are sharp, equal in length and have adequate clearance behind them. This clearance is properly referred to as lip clearance.

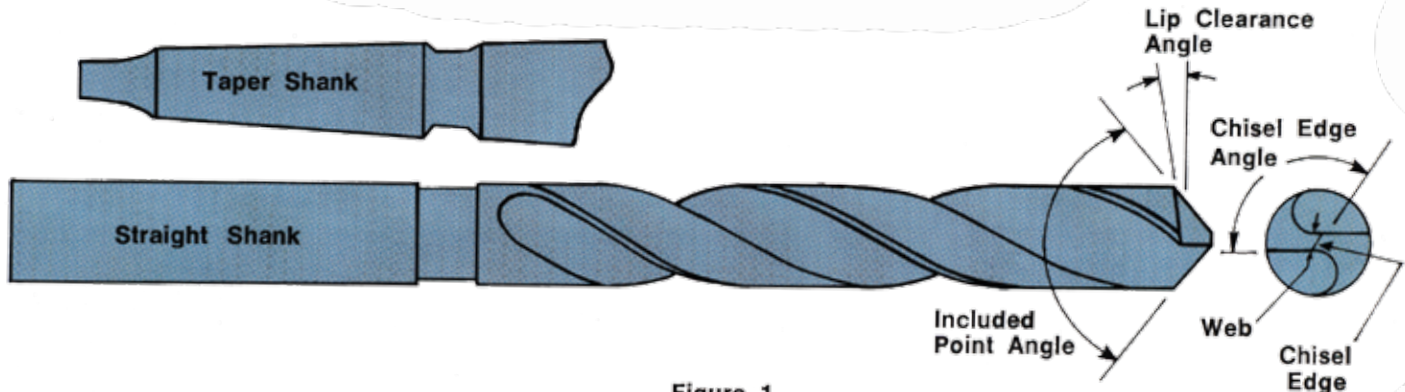


Figure 1

In Figure 2, the two cutting lips are shown as A1 and A2. The surfaces behind the cutting lips are shown as B1 and B2.

If the surfaces B1 and B2 are higher than the cutting lips, then the cutting lips will not contact the work and the drill will not cut.

Figure 3 shows examples of drills with correct and incorrect lip clearance.

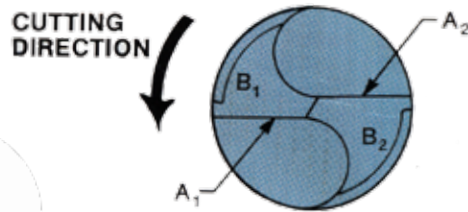


Figure 2



INCORRECT
Reverse lip clearance. Surface behind cutting lip will rub and drill will not cut.



CORRECT
Correct lip clearance. Drill should cut well in most materials.



INCORRECT
Excessive lip clearance. Drill will cut but cutting edges will break down rapidly.

Figure 3