

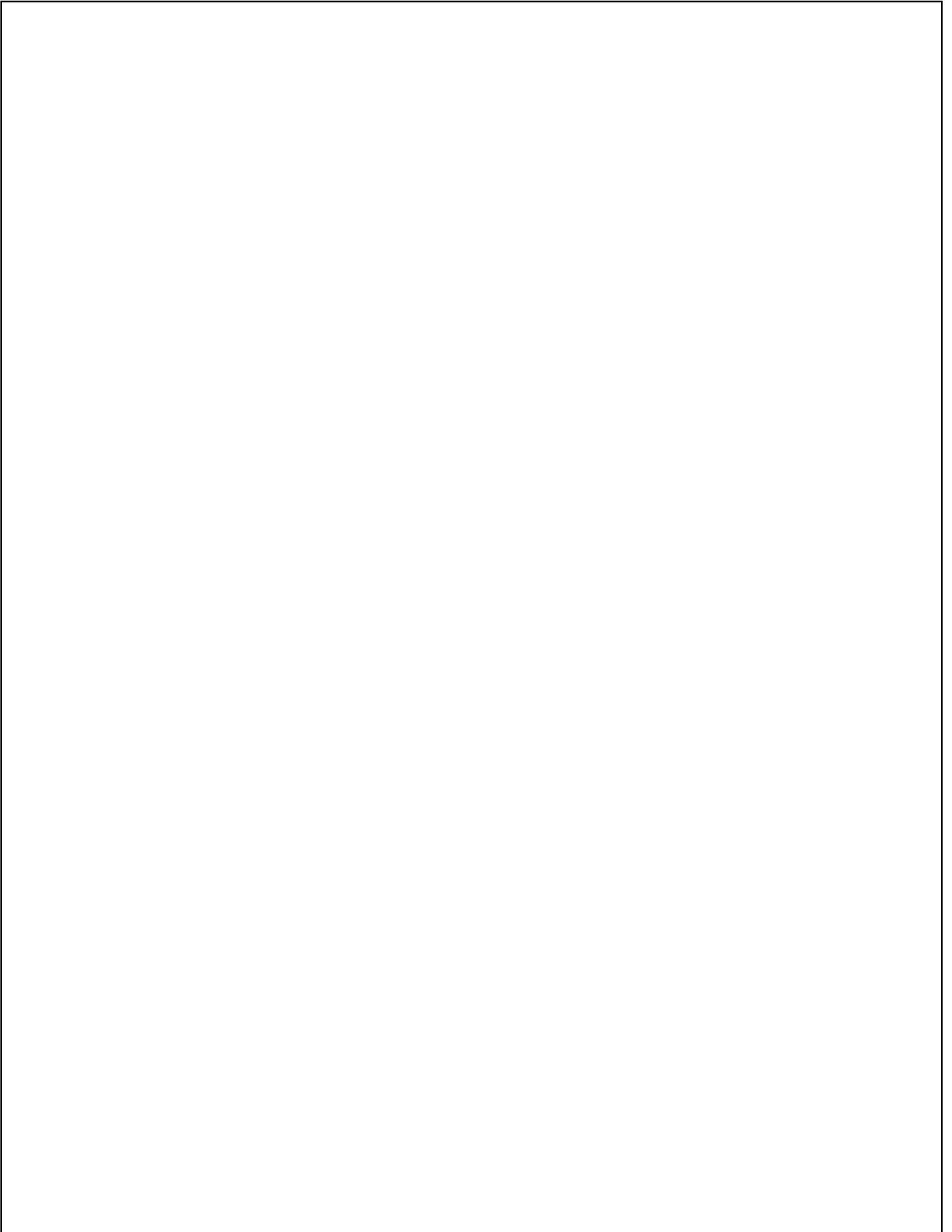
*Setting the Standard With the  
World's Most Valued Grinders.*

# **ACCU-610 AUTOMATIC BEDKNIFE GRINDER**

**This book consists of two manuals:**

The OPERATORS MANUAL which contains all the information on operating and doing routine daily maintenance on this equipment.

The ASSEMBLY and SERVICE MANUAL which is used by the maintenance department to install the equipment and to do all maintenance except routine daily maintenance.



# **ACCU-610 AUTOMATIC BEDKNIFE GRINDER**

## **OPERATORS MANUAL**



### **WARNING**

**You must thoroughly read and understand this manual before operating the equipment, paying particular attention to the Warning & Safety instructions.**

# SAFETY INSTRUCTIONS



**Safety Awareness Symbols** are inserted into this manual to alert you to possible **Safety Hazards**. Whenever you see these symbols, follow their instructions.



The **Warning Symbol** identifies special instructions or procedures which, if not correctly followed, could result in personal injury.

The **Caution Symbol** identifies special instructions or procedures which, if not strictly observed, could result in damage to or destruction of equipment.

1. **KEEP GUARDS IN PLACE** and in working order.
2. **REMOVE WRENCHES AND OTHER TOOLS.**
3. **KEEP WORK AREA CLEAN.**
4. **DON'T USE IN DANGEROUS ENVIRONMENT.** Don't use Grinder in damp or wet locations. Machine is for indoor use only. Keep work area well lit.
5. **KEEP ALL VISITORS AWAY.** All visitors should be kept a safe distance from work area.
6. **MAKE WORK AREA CHILD-PROOF** with padlocks or master switches.
7. **DON'T FORCE THE GRINDER.** It will do the job better and safer if used as specified in this manual.
8. **USE THE RIGHT TOOL.** Don't force the Grinder or an attachment to do a job for which it was not designed.
9. **WEAR PROPER APPAREL.** Wear no loose clothing, gloves, neckties, or jewelry which may get caught in moving parts. Nonslip footwear is recommended. Wear protective hair covering to contain long hair.
10. **ALWAYS USE SAFETY GLASSES.**
11. **SECURE YOUR WORK.** Make certain that the bedbar and bedknife is securely fastened with the clamps provided before operating.
12. **DON'T OVERREACH.** Keep proper footing and balance at all times.
13. **MAINTAIN GRINDER WITH CARE.** Follow instructions in the Assembly and Service Manual for lubrication and preventive maintenance.
14. **DISCONNECT POWER BEFORE SERVICING,** or when changing the grinding wheel.
15. **REDUCE THE RISK OF UNINTENTIONAL STARTING.** Make sure the switch is OFF before plugging in the Grinder.
16. **USE RECOMMENDED ACCESSORIES.** Consult the manual for recommended accessories. Using improper accessories may cause risk of personal injury.
17. **CHECK DAMAGED PARTS.** A guard or other part that is damaged or will not perform its intended function should be properly repaired or replaced.
18. **KNOW YOUR EQUIPMENT.** Read this manual carefully. Learn its application and limitations as well as specific potential hazards.
19. **KEEP ALL SAFETY DECALS CLEAN AND LEGIBLE.** If safety decals become damaged or illegible for any reason, replace immediately. Refer to replacement parts illustrations in Service Manual for the proper location and part numbers of safety decals.
20. **DO NOT OPERATE THE GRINDER WHEN UNDER THE INFLUENCE OF DRUGS, ALCOHOL, OR MEDICATION**

# SAFETY INSTRUCTIONS



**IMPROPER USE OF GRINDING WHEEL MAY CAUSE BREAKAGE AND SERIOUS INJURY.**

Grinding is a safe operation if the few basic rules listed below are followed. These rules are based on material contained in the ANSI B7.1 Safety Code for "Use, Care and Protection of Abrasive Wheels". For your safety, we suggest you benefit from the experience of others and carefully follow these rules.

## DO

1. **DO** always **HANDLE AND STORE** wheels in a **CAREFUL** manner.
2. **DO VISUALLY INSPECT** all wheels before mounting for possible damage.
3. **DO CHECK MACHINE SPEED** against the established maximum safe operating speed marked on wheel.
4. **DO CHECK MOUNTING FLANGES** for equal and correct diameter.
5. **DO USE MOUNTING BLOTTERS** when supplied with wheels.
6. **DO** be sure **WORK REST** is properly adjusted.
7. **DO** always **USE A SAFETY GUARD COVERING** at least one-half of the grinding wheel.
8. **DO** allow **NEWLY MOUNTED WHEELS** to run at operating speed, with guard in place, for at least one minute before grinding.
9. **DO** always **WEAR SAFETY GLASSES** or some type of eye protection when grinding.

## DON'T

1. **DON'T** use a cracked wheel or one that **HAS BEEN DROPPED** or has become damaged.
2. **DON'T FORCE** a wheel onto the machine **OR ALTER** the size of the mounting hole - if wheel won't fit the machine, get one that will.
3. **DON'T** ever **EXCEED MAXIMUM OPERATING SPEED** established for the wheel.
4. **DON'T** use mounting flanges on which the bearing surfaces **ARE NOT CLEAN, FLAT AND FREE OF BURRS**.
5. **DON'T TIGHTEN** the mounting nut **EXCESSIVELY**.
6. **DON'T** grind on the **SIDE OF THE WHEEL** (see Safety Code B7.2 for exception).
7. **DON'T** start the machine until the **WHEEL GUARD IS IN PLACE**.
8. **DON'T JAM** work into the wheel.
9. **DON'T STAND DIRECTLY IN FRONT** of a grinding wheel whenever a grinder is started.
10. **DON'T FORCE GRINDING** so that motor slows noticeably or work gets hot.



**AVOID INHALATION OF DUST** generated by grinding and cutting operations. Exposure to dust may cause respiratory ailments. Use approved NIOSH or MSHA respirators, safety glasses or face shields, and protective clothing. Provide adequate ventilation to eliminate dust, or to maintain dust level below the Threshold Limit Value for nuisance dust as classified by OSHA.

This machine is intended for grinding the bedknife from a reel mowing unit, **ONLY**. Any use other than this may cause personal injury and void the warranty.



To assure the quality and safety of your machine and to maintain the warranty, you **MUST** use original equipment manufactures replacement parts and have any repair work done by a qualified professional.



**ALL** operators of this equipment must be thoroughly trained **BEFORE** operating the equipment.

Do not use compressed air to clean grinding dust from the machine. This dust can cause personal injury as well as damage to the grinder.

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Daily Maintenance .....	Page 6
Getting to Know your Grinder .....	Page 8 - 11
General Operating Instructions .....	Page 12 - 16
Operating Instructions .....	Page 17 - 31

## SPECIFICATIONS

Electrical Requirements .....	115V 50/60 Hz, 15-amp circuit
Net Weight.....	600 lbs [275 kg]
Shipping Weight.....	740 lbs [335 kg]
Maximum Grinding Length .....	34 in. [863 mm]

## DAILY MAINTENANCE

On a daily basis, clean the grinder by wiping all areas down.

On a daily basis, check coolant tray fluid level and filter sock content. Replace filter sock when full (about 6" [15 cm]).

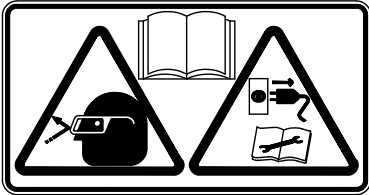
On a daily basis, inspect the grinder for loose fasteners or components and tighten.

Contact your company's Maintenance Department if damaged or defective parts are found.

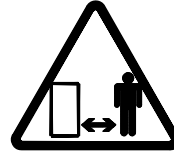


**DO NOT USE COMPRESSED  
AIR TO CLEAN GRINDING DUST  
FROM THE GRINDER.**

# OPERATING INSTRUCTIONS



Symbols for Read operators manual, wear safety glasses and disconnect power before servicing.



Symbol to keep visitors a safe distance away from the grinder.



Symbol for sharp object which will cause serious injury.



Symbol for hot surface which could cause burns.



Symbol for caution relating to RPM of the motor and minimum safe rated RPM of the grinding wheel.



Symbol identifying a panel, cover, or area as having live electrical components within.

# GETTING TO KNOW YOUR GRINDER

Fig. 1 shows the major areas of the Grinder which will be referred to in the operating instructions in the remainder of this manual.

The next few pages show details of some of those areas and point out the various controls you will use when operating.

## CONTROL BOX

The control box contains the electrical controls for the Grinder. Operator switches are located on the top panel. See Page 7 for details.

## GRINDING HEAD

The grinding head consists of the grinding wheel and safety guards, and the motor which drives the wheel. See Page 8 for details. The head can be rotated to change between top-face and front-face grinding.

## DRIVE CARRIAGE AND VERTICAL COLUMN

The carriage and column provide a movable support for the grinding head. Handwheels (see Page 8 for details) adjust the grinding wheel position up and down, or forward and back.

## TRAVERSE MOTOR AND DRIVE SHAFT

A drive shaft with a linear actuator traverses the carriage from side to side, to move the grinding wheel along the bedknife. The shaft is driven by a motor at the right end of the machine.

## BEDKNIFE SUPPORTS

Three support assemblies secure the bedknife for grinding. A fixed support on the left end, and an adjustable support on the right end, have cone-shaped "centers", which fit into the mounting holes on the ends of the bedknife. A third assembly, also adjustable, has a magnetic support for the middle of the bedknife. See Page 9 for details.

## PROXIMITY SWITCHES

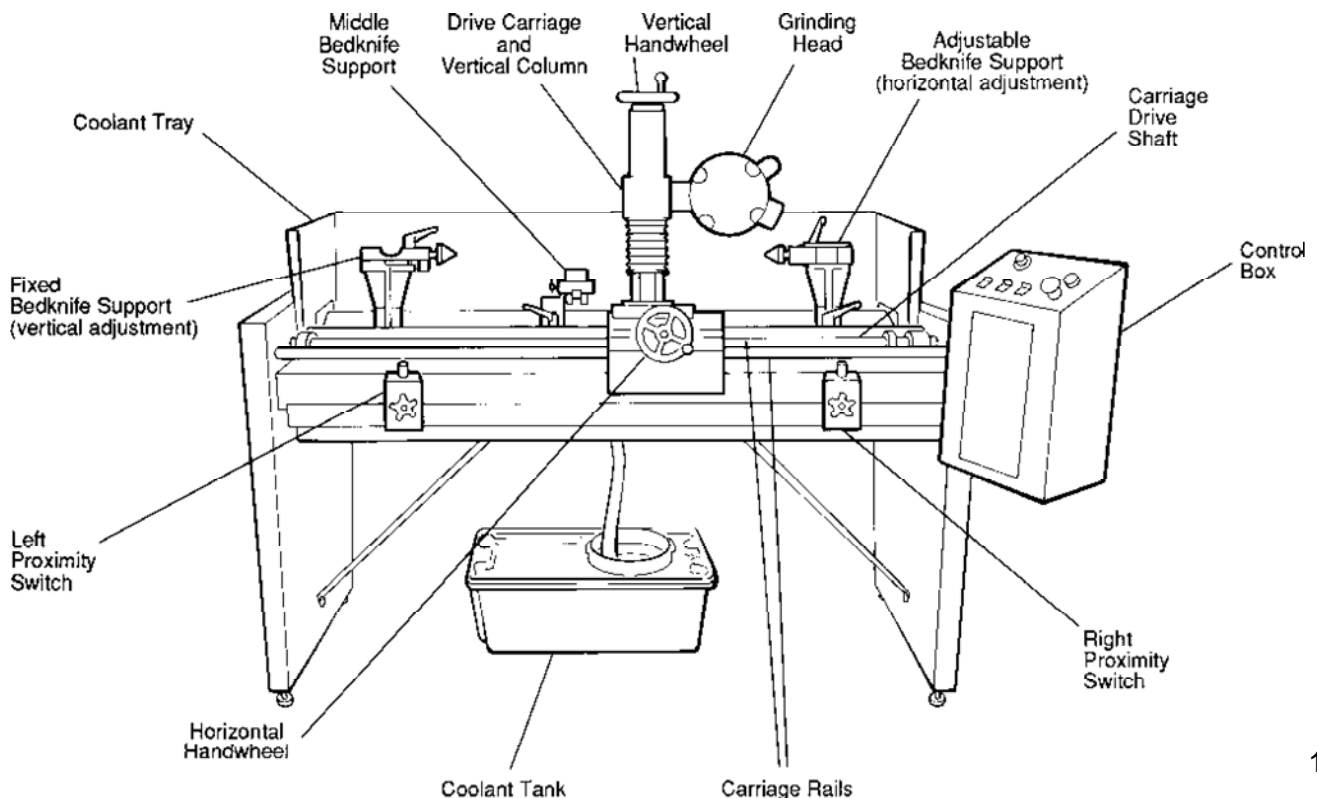
Two movable switches determine the left and right limits of carriage traverse. An LED inside the switch lights when the switch actuator on the bottom of the carriage gets close to the head of the switch (touching the switch head with a steel object will trigger the switch).

## COOLANT TANK

A tank which sets under the Grinder holds liquid coolant to be sprayed onto the bedknife during grinding, to minimize heat buildup.

## COOLANT TRAY

A large tray along the back of the Grinder serves as a splash guard and collects the splashed liquid for return to the Coolant Tank.





# GETTING TO KNOW YOUR GRINDER (Continued)

## CONTROL PANEL (FIG. 2)

### TRAVERSE FT/MIN KNOB

Controls the travel speed of the carriage and grinding head, from 0 - 35 feet [0 - 10.7 meters] per minute.

### START Button (Green)

Acts as a reset button after STOP has been pressed.



**IF ANY SWITCHES ARE IN THE ON POSITION, THEIR FUNCTIONS WILL IMMEDIATELY START WHEN START IS PRESSED.**

### STOP Button (Red)

Shuts down all power to the entire Grinder. For safety, whenever STOP is pressed to shut down the machine, you must press START to reset before the other switches are operable.

### CARRIAGE TRAVERSE Switch (ON/OFF)

Controls electrical power to the motor which turns the drive shaft (to traverse the carriage).

### GRINDING WHEEL Switch (ON/OFF)

Controls electrical power to the grinding head motor.

### COOLANT PUMP Switch (ON/OFF)

Controls electrical power to the flood coolant system.

The START and STOP buttons control the main power to the Grinder. Use the other three switches to control the separate operating functions.

To start the grinding operation:

- \* With all switches OFF, press the START button.
- \* Turn the GRINDING WHEEL switch ON.
- \* Turn the COOLANT PUMP and CARRIAGE TRAVERSE switches ON.



**ALWAYS TURN THE GRINDING WHEEL ON FIRST, TO AVOID A VOLTAGE DROP TO THE REVERSING CIRCUIT OF THE CARRIAGE TRAVERSE.**

## OPTIONAL TOOLS (FIG. 3)

### Angle Finder (optional)

Measures the mounting angles of the bedknife and the grinding wheel motor, so they can be matched (for proper grinding angle). Has a magnetic base.

### Dial Indicator (optional)

Checks the straightness of grind on the top face of the bedknife. Also used to align the centers precisely. Has a magnetic base.

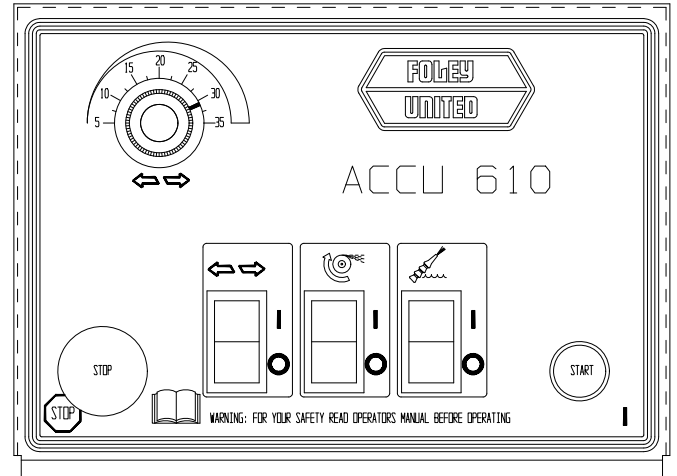


FIG. 2

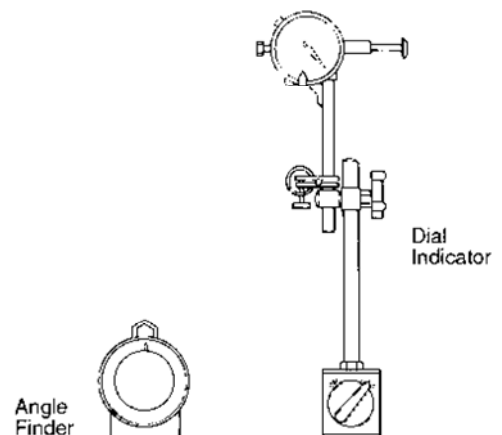


FIG. 3

# GETTING TO KNOW YOUR GRINDER (Continued)

## DRIVE CARRIAGE (FIG. 4 AND FIG. 5)

### Vertical Handwheel

Moves the grinding head up and down.

### Horizontal Handwheel

Moves the grinding head forward and back.

### Vertical Adjustment Scale

Calibrated in .001 in [.025mm] increments, so you can accurately move the grinding wheel down for each pass across the top face of the bedknife.

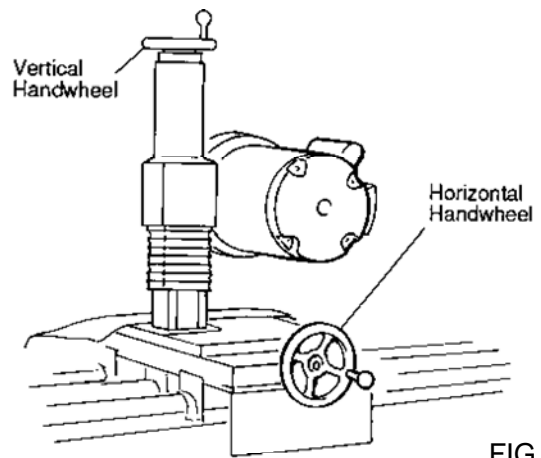


FIG. 4

## GRINDING HEAD (FIG. 6 AND FIG. 7)

### Head Lock Lever

Allows you to pivot the complete grinding head (wheel and motor).



**THE HEAD IS HEAVY AND MUST BE SUPPORTED WHEN THE LOCK IS RELEASED.**

### Wheel Guard Lock Screws

Two T-knobs which hold the guard in position. Loosen them to pivot the guard when the wheel orientation is changed. Align the screws with the arrows on the motor flange.

### Diamond Wheel Dresser

Allows you to dress the grinding wheel to remove any buildup. See Page 12 for more information.

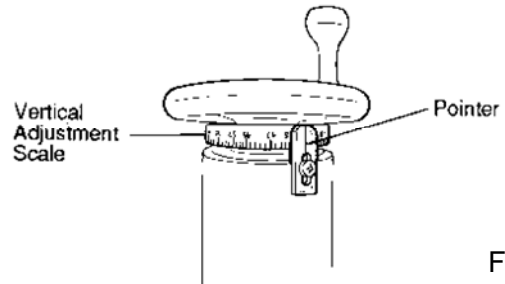


FIG. 5

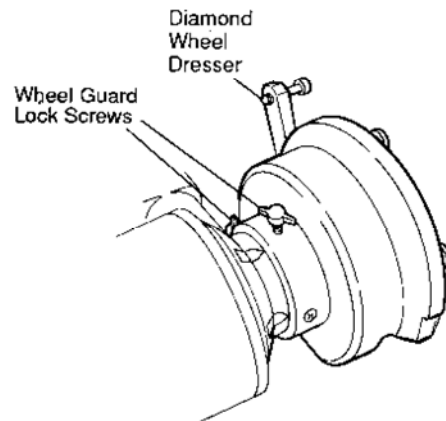


FIG. 6

## COOLANT SYSTEM (FIG. 7)

See Page 13 for more information about the system.

### Coolant Nozzle

Directs a stream of coolant onto the bedknife and grinding wheel, if the coolant system is turned on. For precise aiming, the nozzle and connecting tubing are completely flexible.

### Coolant Flow Valve

Controls the volume of coolant flowing to the nozzle. Use only enough flow to cool the bedknife. Excess flow will cause excess splashing - and **won't** improve performance.

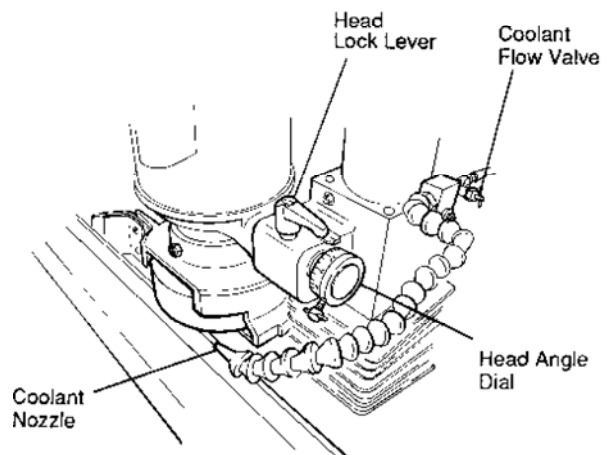


FIG. 7

# GETTING TO KNOW YOUR GRINDER (Continued)

## FIXED BEDKNIFE SUPPORT (FIG. 8)

### Center Lock Knob

Locks the center in position, after the center has been screwed in or out.

### Center Alignment Lever

Moves the center **up or down** for alignment with the center on the adjustable support.

The vertical adjustment range is  $\pm 0.125$  in. [3.2 mm] from true center.

## MIDDLE BEDKNIFE SUPPORT (FIG. 9)

### Support Lock Lever

Locks the entire support assembly in position on the support bar.

### Tilt Lock Lever

Locks the upper portion of the support in its front-to-back position after it has been aligned with the bottom of the bedknife.

### Magnet Lock Knob

Locks the magnet (on top of the support) in position after it has been aligned with the bottom of the bedknife.

### Locking Screw

Bites into the upper part of the support when the tilt lock lever is tightened, for added security. If the lock weakens, turn the screw in further.

## ADJUSTABLE BEDKNIFE SUPPORT (FIG. 10)

### Support Lock Lever

Locks the entire support assembly in position on the support bar.

### Center Lock Knob

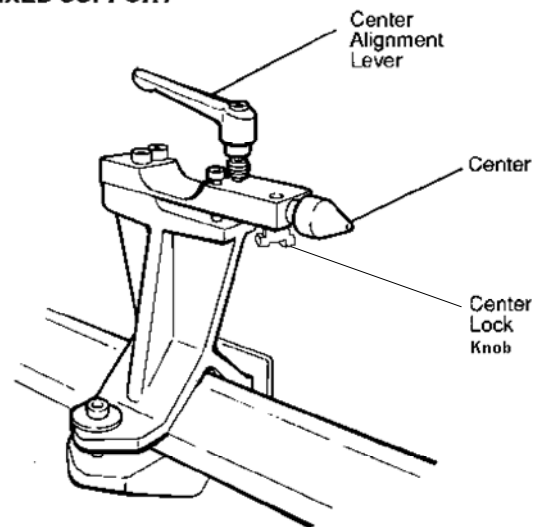
Locks the center in position, after the center has been screwed in to secure the bedknife.

### Center Alignment Lever

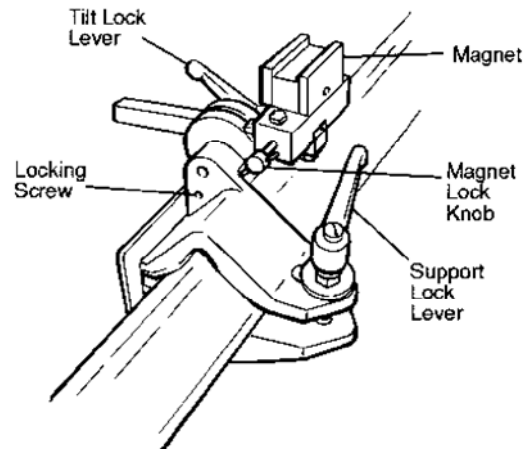
Moves the center forward or back for alignment with the center on the fixed support.

The horizontal adjustment range is  $\pm 0.125$  in [3.2 mm] from true center.

## FIXED SUPPORT



## MIDDLE SUPPORT



## ADJUSTABLE SUPPORT

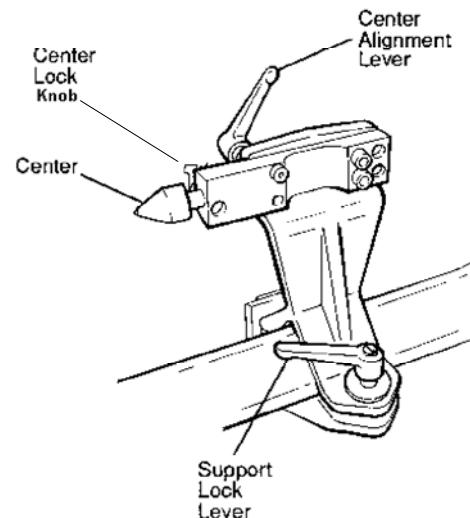


FIG. 8

FIG. 9

FIG. 10

# GENERAL OPERATING INFORMATION

## WHEN TO SHARPEN THE BEDKNIFE

**NOTE:** To fully sharpen a reel mower, you need to grind the reel blades (using a Reel Grinder) **and** reshape the cutting edge of the bedknife (using the 610 Bedknife Grinder).

**NOTE:** New bedknives should be ground before being put into use.

When the grass is not being cut cleanly, or the cut ends of the grass appear torn or ragged, the edges of the reel blade and bedknife have become rounded and need sharpening. See FIG. 11-A. The purpose of sharpening is to restore the match between the reel blades and the cutting edge of the bedknife. See FIG. 11-B.

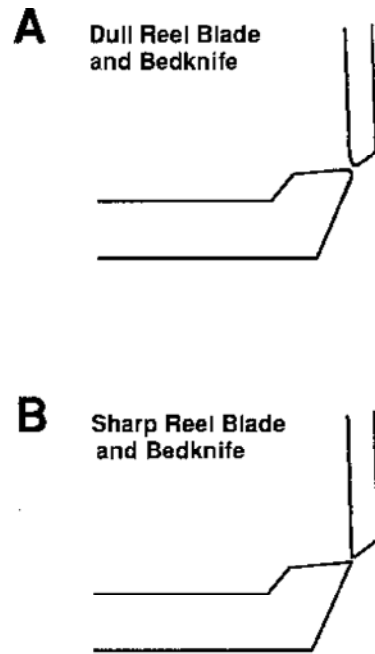


FIG. 11

## BEDKNIFE GRINDING ANGLES

The bedknife has two faces that normally need to be ground - the top face and the front face (on some models, the front face may be curved and not need grinding.)

The proper grinding angles for the two faces will vary, depending on the reel manufacturer - **always follow** the manufacturer's recommended specifications for these angles.

Typically, however:

- \* There will be a 3-10 degrees clearance angle ground on the top face. It will **usually** be measured relative to the bedknife mounting surface. See FIG. 12-A.
- \* There will be a 2-17 degrees clearance angle ground on the front face. It will **usually** be measured relative to a line **perpendicular** to the bedknife mounting surface. See FIG. 12-B.

If the manufacturer measures the clearance angle relative to some **other** surface, you will have to adjust our calculations accordingly.

How to obtain these angles is discussed in more detail in the operating instructions, beginning on Page 21 - 22.

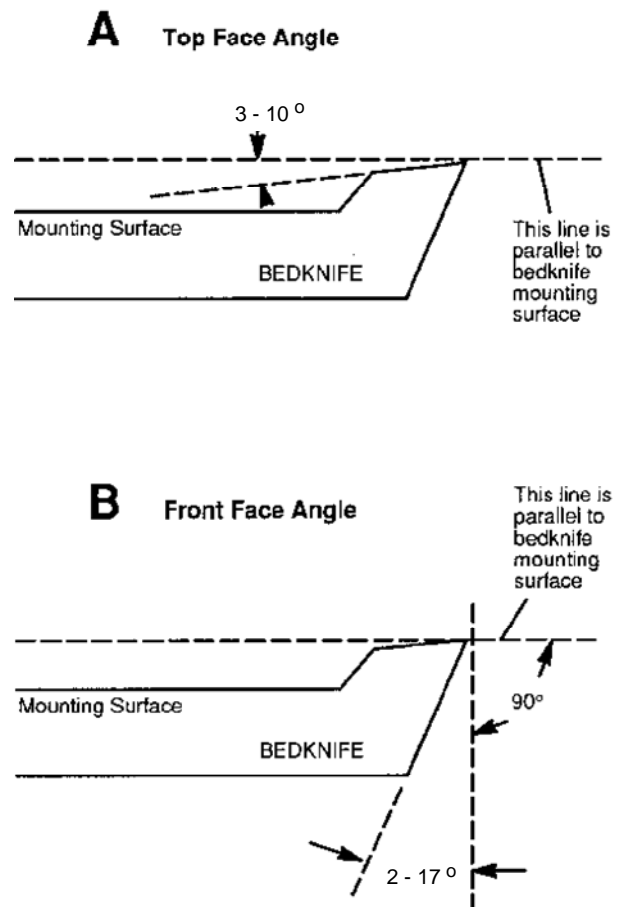


FIG. 12

# GENERAL OPERATING INFORMATION (Continued)

## MOUNTING A GRINDING WHEEL

To replace the grinding wheel: See FIG. 13.

1. Turn the GRINDING WHEEL switch OFF.
2. Remove two of the three screws that hold the wheel cover guard.
3. Unscrew the mounting flange that holds the grinding wheel - use a 3/4" open-end wrench.
4. Remove the old wheel and install the new one.
5. Screws on the flange finger tight, then tighten 1/8 turn further with the wrench. It will self-tighten when the motor is turned on.

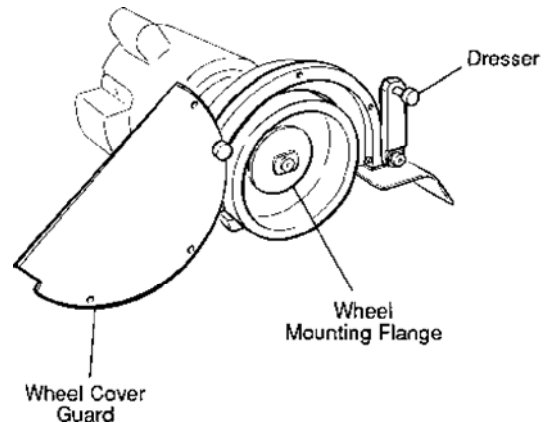


FIG. 13



**IF THE WHEEL FLANGE IS OVERTIGHTENED, THE GRINDING WHEEL MAY CRACK AND EVENTUALLY FLY APART.**

6. Reattach the wheel cover guard.
7. After you install a new or different wheel, we recommend that you dress it before grinding. See Page 12.

## GRINDING WHEELS FOR MODEL 610

WHEEL PART NO.	COLOR/DESCRIPTION/SIZE	GRIT	USE FOR GRINDING
3700060	White/red flare-cup wheel 6/3-1/4 x 2 0.627 inch bore, vitrified ruby	60	Medium duty
3700062	White flare-cup wheel, 6/ 3-1/4 x 2 0.627 inch bore, vitrified	46	Light duty
3700065	White flare-cup wheel, 7/ 3 x 2 0.627 inch bore, vitrified	46	Light duty
3700066	White/red flare-cup wheel, 7/ 3 x 2 x 0.627 inch bore, vitrified ruby	60	Medium duty
3700268	White/red straight-cup wheel, 6 x 2 x 0.627 inch bore, vitrified ruby	60	Medium duty
3700411	White straight-cup wheel, 6 x 2 x 1.25 inch bore, vitrified	46	Light duty
3700696	Borazon straight-cup wheel, 6 x 1-1/2 x 0.625 inch bore	120	Hardened bedknife (long life)

**For more information on flare-cup wheels, see Page 14.**

# GENERAL OPERATING INFORMATION (Continued)

## DRESSING THE GRINDING WHEEL

Dress the grinding wheel whenever there is any glazing ("glazing" is the buildup of stone dust, grinding grit, and coolant on the face of the wheel). For best results, also dress the wheel before making the final grind.



**REFER ALSO TO THE "SAFETY RULES WHEN GRINDING" ON PAGE 3.**

For dressing, always move the grinding head to the right hand side of the machine as shown in FIG. 14, so you are clear of the bedknife. **Don't change** the angle of the grinding head when dressing.

With the wheel spinning, swing the dresser around to the grinding face of the wheel and turn the screw until the diamond point just touches the wheel. See FIG. 15-A or 15-B.

**NOTE:** Excessive dressing will shorten the life of the wheel.

## Replacing the Wheel

A new grinding wheel is 2" [51 mm] deep. When it wears down to a depth of 0.75" [19 mm], it should be replaced. See FIG. 16.

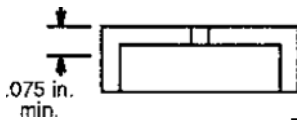


FIG. 16

## ROTATING THE WHEEL GUARD

When you rotate the grinding wheel guard (to change from top-to front-face grinding, or vice versa), make sure there is **no gap** between the guard and the motor flange. See FIG. 17.

If you leave a gap, the dresser may not swing perpendicular to the grinding wheel spindle - and may dress the wheel unevenly.

Also, for proper clearance between the grinding wheel guard and the bedknife, the guard screw must align to the arrow on the motor flange. See FIG. 17.

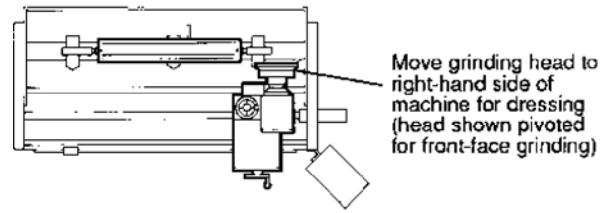
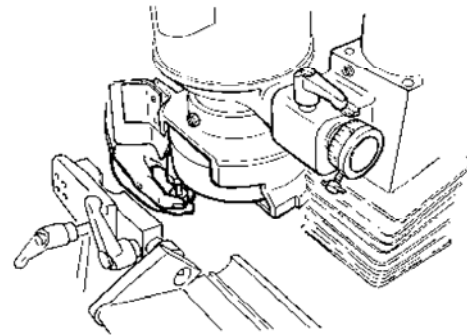


FIG. 14

## A Dressing When Top-Face Grinding



## B Dressing When Front-Face Grinding

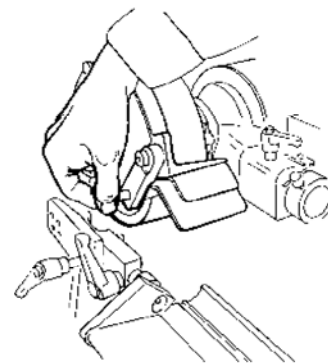


FIG. 15

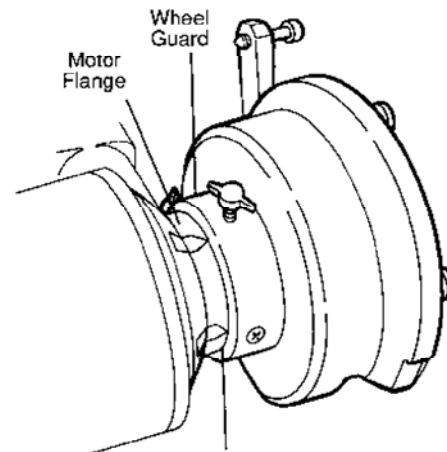


FIG. 17

# GENERAL OPERATING INFORMATION (Continued)

## USING FLOOD COOLANT

For quality grinding, we highly recommend using flood coolant to prevent heat buildup on the knife edge.



**IF YOU DO DRY-GRIND, NEVER GET THE BEDKNIFE EDGE RED-HOT OR YOU WILL LOSE THE TEMPER IN THE KNIFE EDGE.**

**AVOID CONTACT OF COOLANT WITH EYES: IT WILL CAUSE EYE IRRITATION. WEAR FACE SHIELD OR GOGGLES WHEN HANDLING CONCENTRATE. IN CASE OF CONTACT, FLUSH EYES WITH WATER FOR 15 MINUTES AND CONTACT A PHYSICIAN.**



**AVOID BREATHING MISTS. PROVIDE LOCAL VENTILATION. KEEP CONCENTRATED BOTTLE CLOSED WHEN NOT IN USE.**

**CONTINUED CONTACT OF CONCENTRATE ON SKIN MAY CAUSE IRRITATION. WASH WITH SOAP AND WATER AFTER CONTACT.**

**DO NOT TAKE INTERNALLY. IF INGESTED, CONSULT PHYSICIAN AND DO NOT INDUCE VOMITING.**

**(HAZARD POTENTIAL APPLIES TO CONCENTRATE, AND IS LESS AT NORMAL USE DILUTION.)**

### Mixing the Coolant

Mix Part No. 3708200 Coolant in the Coolant Tank, at a ratio of 50 parts water to 1 part concentrate. Refer also to the label on the Coolant container. If the Tank is empty, this will take about 32 quarts of water and 2/3 quart of concentrate [30 liters of water, and 0.6 liter of concentrate].

### Using the Coolant

Direct the nozzle so the coolant sprays onto the bedknife face being ground. See FIG. 18 or 19. Some coolant will then also be deflected onto the grinding wheel, but splatter beyond the coolant tray will be minimized. Adjust the flow valve so there is a steady stream of coolant. Avoid a stronger flow than needed - excessive coolant doesn't cool more, and increases splattering.

Using Coolant When Grinding Top Face

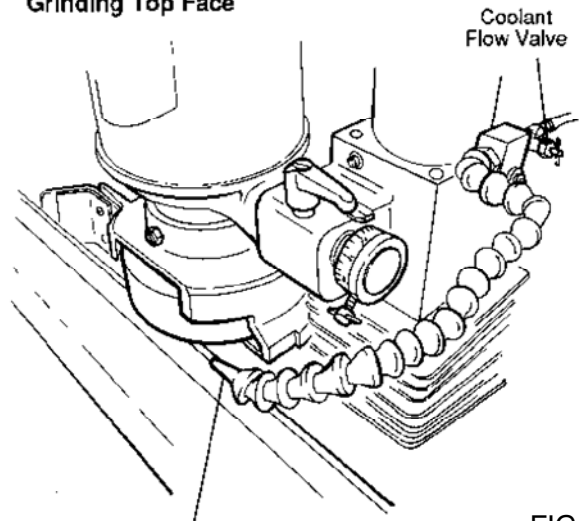


FIG. 18

Using Coolant When Grinding Front Face

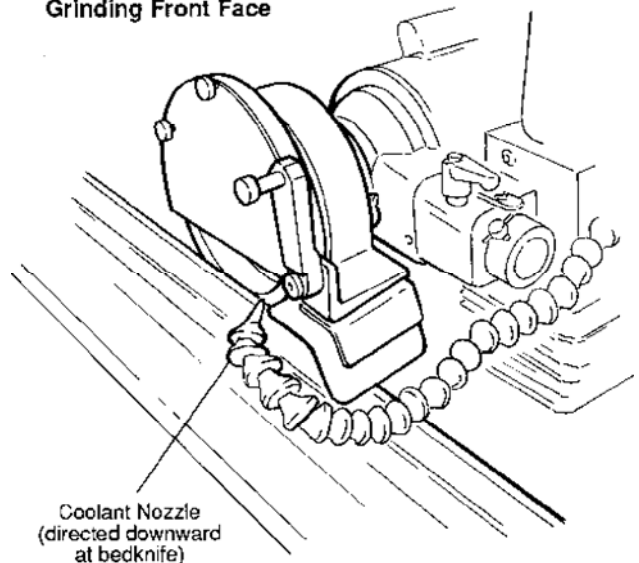


FIG. 19

### Fluid Level in Coolant Tank

Check the fluid level in the Coolant Tank daily to avoid running out while grinding. Keep the coolant level between 1 and 4" [25 and 100 mm] from the top of the tray. The pump inlet must **always** be completely submerged in water. Never add plain water to the coolant when the level is low. Always add water and concentrate in the correct proportions.

## GENERAL OPERATING INFORMATION (Continued)

### USING A FLARE CUP WHEEL FOR ADDED CLEARANCE

The shape of some bed bars requires using an **optional** flare-cup grinding wheel to clear the end supports. See FIG. 20 and 21.

Flare-cup wheels can be ordered in 6 and 7" [150 and 175 mm] diameter versions. For most applications, the 6" wheel is used. However, if the end mounting flanges of the bedknife are more than 2" [50 mm] high or near the front face of the knife, you may need the 7" wheel.

For Part No.'s and descriptions, refer to the Grinding Wheels list on Page 11.

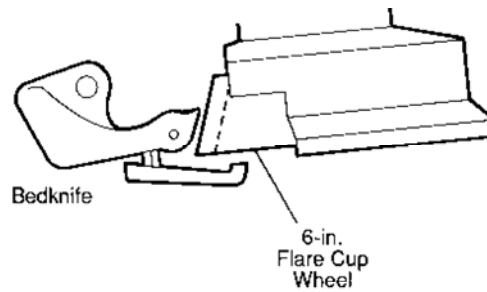


FIG. 20

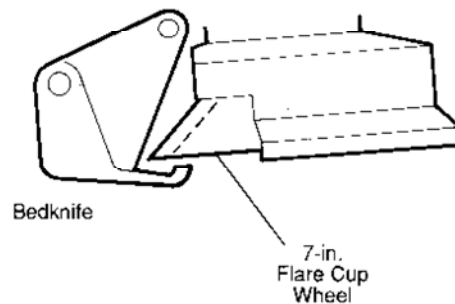


FIG. 21

### LINK MOUNTING

Some bedknives require extra support because of the weight of their center bracket or because of excessive imbalance in the weight of the knife.

Link components for providing this support are supplied with the Grinder in a separate bag. Attach the links to the bedknife bracket and to the bar on the middle support, then adjust their length as required. See FIG. 22.

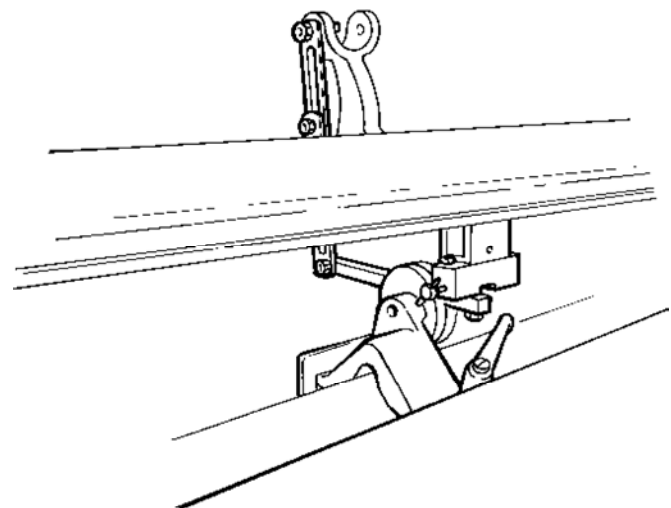


FIG. 22



# OPERATING INSTRUCTIONS

## ALIGNING THE CENTERS

To assure the alignment of the bedknife to the reel in the mowing unit, this grinder has two alignment methods.

The first method is to align the centers as accurately as possible to the grinding head traverse. Because the bed bar is mounted into the frame of the mowing unit on fasteners, mounting the bed bar using centers at these points best represents the bed bar in actual mowing application. The second method, to be reviewed later, is to align the bedknife faces to the grinding head traverse.

Refer to FIG. 23. Before mounting a bedknife, check the alignment of the centers on the fixed and adjustable bedknife supports:

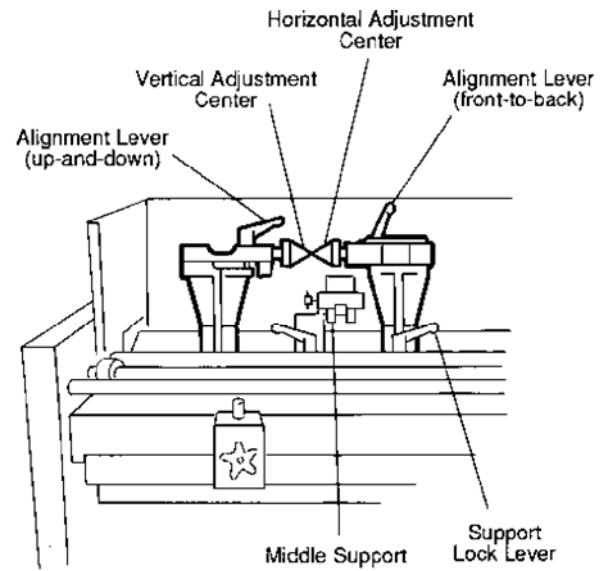
1. Check that both centers are screwed into their mounting blocks until the V-groove just shows. See FIG. 24. This will allow you to screw the center **out** by as much as 1/4" [6.5 mm] or **in** by as much as 1/2" [12.7 mm] for final positioning.
2. Wipe any grindings, dirt, etc., from the support bar. Slide the middle and adjustable supports to the left as shown in FIG. 23, until the fixed and adjustable centers lightly touch - or are at most .004" [.01 mm] apart.

Secure the adjustable support in this position by tightening the support lock lever. Make certain the pads of the adjustable (right) support casting are in full and uniform contact with the machined surface of the support bar.

3. The tips of the centers should be aligned (both vertically and horizontally). If not, realign them:
  - \* Turning the center alignment (top) lever on the **fixed** support moves that center **up or down**.
  - \* Turning the center alignment (rear) lever on the **adjustable** support moves that center **forward or back**.

**NOTE:** The two centers each have an adjustment range of +/- 0.125" [3.2 mm] from true center.

4. Visually aligning the centers as in Step 3 should be accurate within .010" [.25 mm]. See FIG. 25. When grinding greens mower bedknives, it is more critical that the two centers be parallel with the carriage rails, and visual alignment may not be adequate.



23

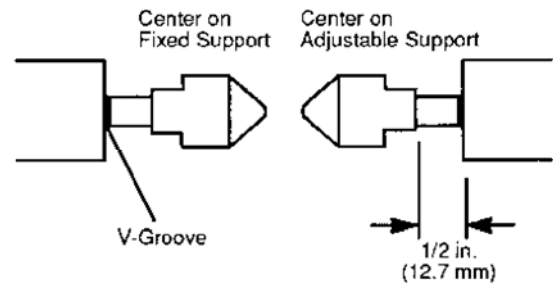


FIG. 24

If you align centers visually, Dimension A should be the same at both ends and Dimension B should be the same at both ends - within ±.010 in. (0.25 mm)

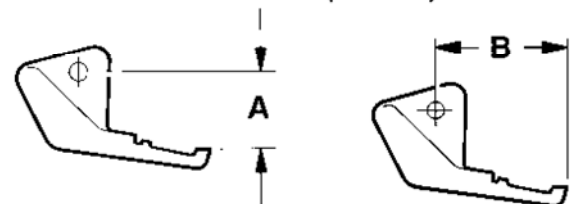


FIG. 25

# OPERATING INSTRUCTIONS (Continued)

## ALIGNING THE CENTERS (Continued)

### Using the Optional Dial Indicator for More Accurate Center Alignment

For more accurate **vertical** alignment, attach the **optional** dial indicator to the vertical column (have the indicator arm touching the **top of** the right-hand center as in FIG. 26). Read the dial, then move the carriage until the indicator arm rests on top of the left-hand center. The dial readings should be the same - if not, adjust the center alignment lever on the fixed (left) support.

For more accurate **horizontal** alignment, follow a similar procedure. Touch the side of the left-hand center with the indicator arm (dotted line in FIG. 26), then move until the indicator arm touches the side of the right-hand center. If necessary, adjust the center alignment lever on the adjustable (right) support.

When centers are aligned, loosen the support lock lever and move the adjustable (right) support and the middle support to their approximate working positions and leave loose.

Because of very small variations in the center support bar, we recommend as a check to locate the right side adjustable center support in the position it will be used and tighten it down without a bedknife. Then use the optional dial indicator to verify center alignment in this working position. When complete, loosen the clamp on the right side adjustable center support and you are ready to install a bedknife.

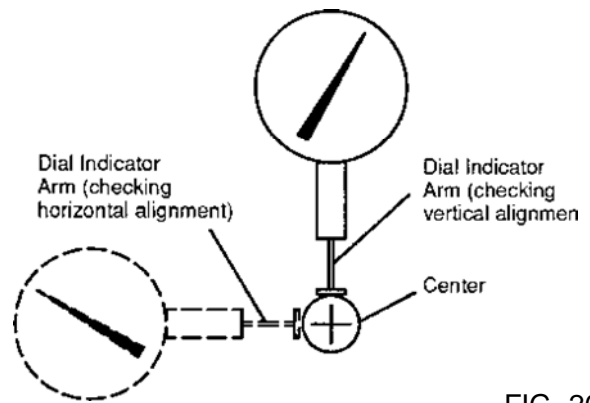


FIG. 26

# OPERATING INSTRUCTIONS (Continued)

## MOUNTING A BEDKNIFE FOR GRINDING

### Inspect and Clean the Bedknife

Inspect the bedknife for damage (cracks, warpage, bushing wear, excessive knife wear). Replace or repair if necessary - see the manufacturer's manual. Thoroughly clean the bedknife, especially on the bottom where the middle support's magnet will attach.

### Prepare the Machine for Mounting

Pivot the grinding head to the vertical position. Traverse it all the way to the left, then crank it up (so the adjustable support will be easier to reposition).

Check the alignment of the centers on the fixed and adjustable supports (this is especially critical when grinding greens mower bedknives). Always wipe any grindings, dirt, etc. from the support bar before moving the supports.

### Mount the Bedknife on the Three Supports

1. Loosen the tilt lock lever and magnet lock knob on the middle support. See FIG. 29. Move the magnet down and away from the bedknife location, then tighten the tilt lock lever enough to secure the magnet support rod.
2. Adjust the center on the adjustable (right) support so its V-groove just shows. See FIG. 27.

Move the right support to the right until the bedknife fits between the centers on the fixed and adjustable supports. Leave the right support lock lever loose.

3. Slide the middle support along the support bar so it is approximately centered under the bedknife, then lock it in place. Be sure the pads are in full contact with the machined surfaces of the support bar.
4. See FIG. 28. Insert the left end of the bedknife into the center on the fixed (left) support. Align the right end of the bedknife with the adjustable (right) support, and move the adjustable support in until its center holds the right end of the bedknife. Tighten the right support lock lever.

**! DON'T FORCE THE CENTER TIGHTLY INTO THE BEDKNIFE. THIS COULD DISTORT AND MISALIGN THE ADJUSTABLE SUPPORT. LEAVE THE CENTER LOOSE BY .005 - .015" [.15 - .4 mm], THEN REMOVE THIS LOOSENESS AS EXPLAINED IN STEP 5.**

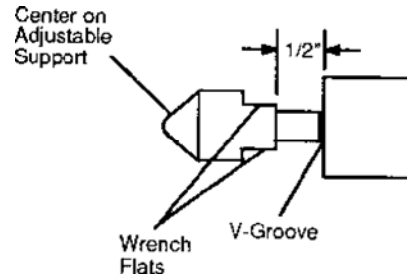


FIG. 27

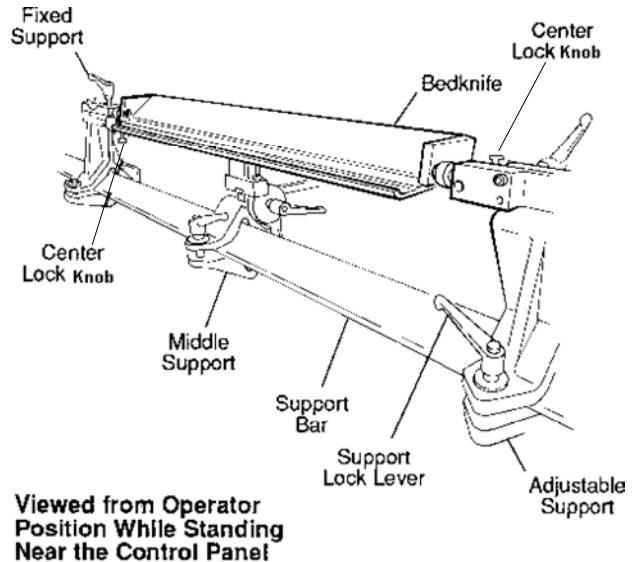


FIG. 28

# OPERATING INSTRUCTIONS (Continued)

## MOUNTING A BEDKNIFE FOR GRINDING (Continued)

**!** BE SURE THE PADS OF THE ADJUSTABLE (RIGHT) SUPPORT CASTING ARE IN FULL CONTACT WITH THE MACHINED SURFACES OF THE SUPPORT BAR.

5. With your hand turn the center on the adjustable support until the bedknife is held snugly with zero free play.

**!** DON'T OVERTIGHTEN THE CENTERS - BUT BE SURE THEY ARE TIGHT ENOUGH SO THE BEDKNIFE WON'T MOVE WHILE BEING GROUND. DO NOT USE ANY TOOLS ON THE CENTERS. HAND TIGHTEN ONLY.

6. As a starting position, pivot the bedknife so its cutting edge is 0 - .5" [0 - 12 mm] lower than the centerline of the centers on the fixed and adjustable supports. See FIG. 30.

NOTE: This positions the bedknife's cutting edge so that the grinding head can be lowered enough for front-face grinding and raised enough for top-face grinding without changing the bedknife angle. The grinding head will be in the upper part of its vertical range when top-face grinding, and in the lower part of its vertical range when front-face grinding.

7. Square up the middle support to the bottom surface of the bedknife. Lock it in place by tightening the tilt lock lever. See FIG. 29. Be sure the magnet is far enough back from the front face that it won't interfere with the wheel when grinding the front face.

**!** SOME BEDKNIVES REQUIRE EXTRA SUPPORT BECAUSE OF THEIR IMBALANCE. REFER TO "LINK MOUNTING" ON PAGE 14.

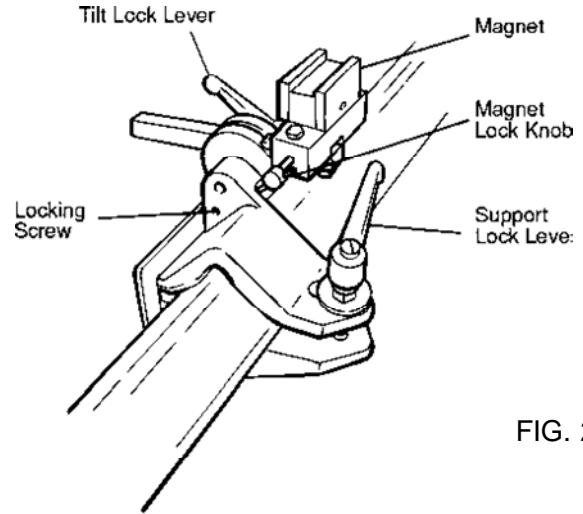


FIG. 29

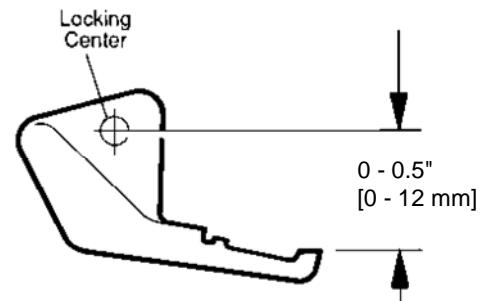


FIG. 30

## OPERATING INSTRUCTIONS (Continued)

### ALIGNING THE BEDKNIFE

Included with your grinder is an alignment Touch Gage. See FIG. 31.

This Touch Gage has been designed to align the bedknife top and front faces to the grinding head traverse for an accurate grind.

This alignment method is different than the centers alignment detailed on page 15 in that in this alignment you are aligning the bedknife faces to the grinding head traverse.

The reason for doing this is that many bedknives are worn unevenly to the centers mounting, primarily due to the reel adjustments.

To get the maximum life from these bedknives and remove the least stock, you will want to grind them using the established surfaces as the alignment. This Touch Gage aligns for this purpose.

**SOME REEL ASSEMBLIES, ESPECIALLY ON GREENS MOWERS, HAVE A MINIMAL ADJUSTMENT RANGE. BE SURE THE MISALIGNMENT YOU USE IS WITHIN THE RANGE OF THE REEL ASSEMBLY SO YOU CAN ACHIEVE PROPER REEL-TO BEDKNIFE ADJUSTMENT.**

To use the gage, install it on the end of the motor pivot shaft. Seat the radius of the bracket tight to the motor pivot shaft and tighten the tee knob at tight as you can by hand. The position of the bracket must be so that the two sliding pins on the gage are very close to vertical and horizontal with your eye.

Move the grinding head infeed horizontal and vertical handwheels so that the gage pins are contacting the top and front faces of the bedknife.

**WHEN MOUNTING THE BEDKNIFE, AS COVERED IN A PREVIOUS SECTION, THE MAGNET TILT LOCK LEVER WAS TIGHTENED AND THE SWIVEL LOCK KNOB WAS LEFT LOOSE. IT IS CRITICAL FOR CORRECT ALIGNMENT THAT THIS MAGNET SWIVEL LOCK KNOB BE LOOSE DURING ALIGNMENT ADJUSTMENTS.**

With the gage at the right end of the bedknife, adjust the grinding head vertical and horizontal infeed handwheels until the back side of the floating pins are perfectly flush with the pin block. See FIG. 32.

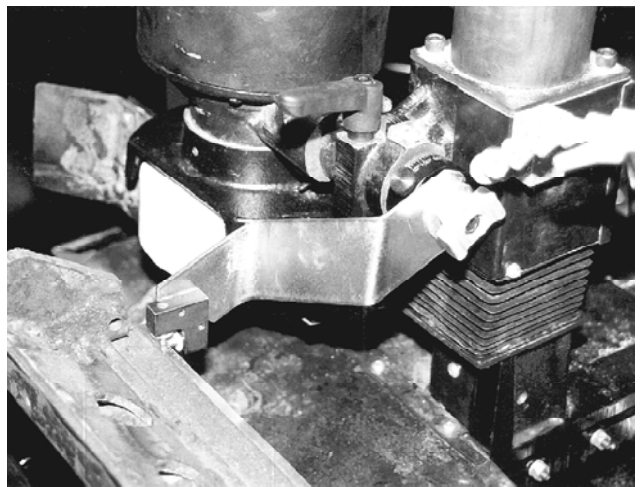


FIG. 31

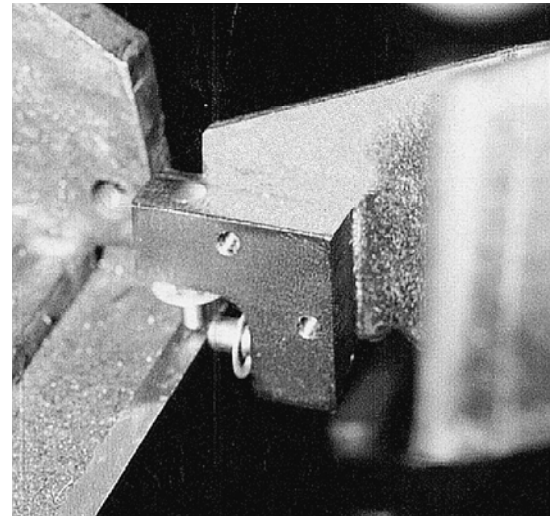


FIG. 32

## OPERATING INSTRUCTIONS (Continued)

### ALIGNING THE BEDKNIFE (Continued)

This is accomplished by feel. Touch is very sensitive and very accurate. You can feel a difference in height of .002 inch. This accuracy is excellent as a starting location for grinding your bedknife.


Next, move the grinding head to the left end of the bedknife. Now adjust the vertical alignment lever on the (left) fixed center support until the vertical pin on the touch gage is flush. This is a course adjustment to establish the bedknife within a reasonable window. All accurate adjustments are done with the touch gage at the right side of the bedknife.

Next, adjust the horizontal infeed handwheel first and then the vertical infeed handwheel on the grinding head until both pins are again flush. NOTE: At this time the touch gage is at the left end of the bedknife.

Next, move the grinding head and touch gage to the right end of the bedknife. Now without moving the grinding head infeed, adjust the vertical adjustment handle on the (left) fixed center support until the vertical pin on the touch gage is flush.

Now, adjust the horizontal adjustment handle on the (right) adjustable center support until the horizontal pin on the touch gage is flush. Due to the angles on the top and front face of the bedknife, adjusting either the horizontal or vertical adjustment will affect the other. Therefore, you must adjust either the horizontal or vertical until pins are perfectly flush.

**WHEN ADJUSTING A BEDKNIFE TO A REEL ON A MOWING UNIT, THE TOP FACE OF THE BEDKNIFE, WHICH IS CONTROLLED BY THE VERTICAL PIN, IS THE MOST CRITICAL AND REQUIRES THE MORE ACCURATE ADJUSTMENT.**

 **IT IS CRITICAL THAT THE ACCURATE ADJUSTMENTS, BOTH HORIZONTAL AND VERTICAL, BE DONE WITH THE TOUCH GAGE AT THE RIGHT END OF THE BEDKNIFE.**

You may be required to go from left side to right side several times, always adjusting on the right side until the bedknife is in alignment.

Your bedknife should now be in alignment with the grinding head carriage shafts and give a good bedknife grind.

You must now tighten the center support magnet swivel lock knob shown in FIG. 29. Now remove and store the touch gage and retighten the tee knob in the motor pivot shaft.

## OPERATING INSTRUCTIONS (Continued)

### GRINDING THE TOP FACE

**NOTE:** The following instructions presume that you have already studied "General Operating Information" starting on Page 10.

#### Position the Head for Top-Face Grinding

The grinding head should still be vertical after mounting the bedknife. If not, loosen the two T-knobs (FIG. 17) on the wheel guard, rotate the guard so the wheel is open to the bedknife, and lock the guard in place (align the arrow and screw).

Crank the vertical and horizontal handwheels until the head is in the approximate position for top-face grinding:

- \* The grinding wheel should just touch the top face of the bedknife, and
- \* If possible, the grinding wheel rim should extend over the bedknife top surface. See FIG. 33.

#### Adjust the Grinding Wheel Angle

Using one of the following methods, adjust the angle of the grinding head so it matches the angle of the bedknife. See also "Bedknife Grinding Angles" on Page 10.

##### Method 1: Using the Optional Angle Finder

1. Determine the top face angle of the bedknife:
  - a. If you want to **match the existing angle**, set the angle finder on the top face of the bedknife and read the dial. See FIG. 34A. In step 2 below, you will adjust the grinding head to this same angle.

**NOTE:** If the bedknife has been excessively adjusted and lapped since its last grinding, you may be able to find (on some bedknives) a small area outside the wear area to determine the top face angle.

- b. If you have the **manufacturer's specifications** for the angle, set the angle finder on the bedknife mounting surface. See FIG. 34B. (Or use whatever is the manufacturer's plane of reference for the angle.) Read the dial, and add in the recommended back angle to determine the grinding wheel angle. **EXAMPLE:** If the mounting surface is at 20 degrees right of 0, and the manufacturer specifies a 10 degree back angle, you will want the grinding wheel to be at 30 degree right of 0.

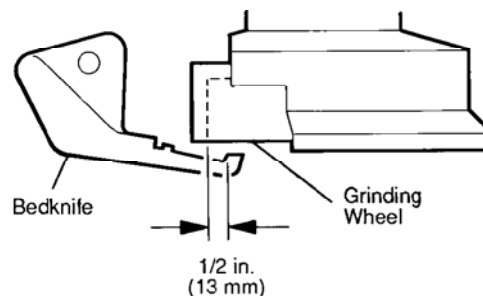


FIG. 33

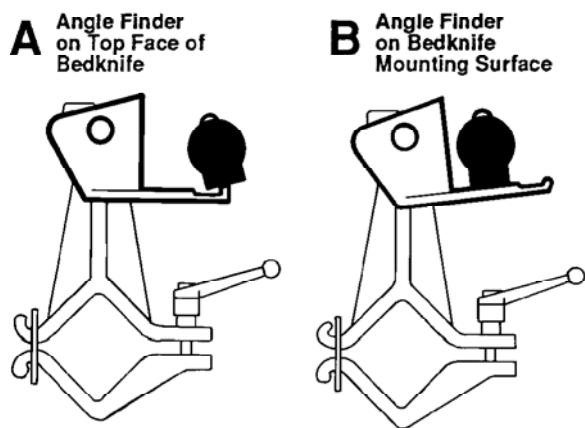


FIG. 34

## OPERATING INSTRUCTIONS (Continued)

### GRINDING THE TOP FACE (Continued)

- c. If you are unable to use a top-face surface, place the angle finder under the bedknife. See FIG. 35. Because the angle finder has two scales (one on each side of 0), you can calculate the grinding wheel angle in the same way as the example above.

FIG. 35 assumes that the bottom of the bedknife is parallel to the bedknife mounting surface. If not, you will have to adjust your calculations accordingly.

2. Set the angle finder on top of the motor. See FIG. 36. Loosen the head lock lever to move the grinding head, and adjust the head so it is at the angle determined in Step 1 above.



**THE GRINDING HEAD IS HEAVY AND MUST BE SUPPORTED WHEN THE LOCK LEVER IS RELEASED.**

This is an approximate location. For more accuracy in finding the angle, turn the GRINDING WHEEL switch OFF, touch the wheel to the bedknife by hand to see where it is contacting, and make final adjustments to the head angle.

### Method 2: Without the Optional Angle Finder.

If you don't have the optional angle finder, you will have to adjust the grinding head angle to match the bedknife angle by moving the head to the position shown in FIG. 38.

Determine the proper angle by visually matching the wheel angle to the bedknife angle. For final adjustments, turn the GRINDING WHEEL switch OFF and manually touch the wheel to the bedknife top face to where it is contacting.

**NOTE:** If the bedknife has been excessively adjusted and lapped since its last grinding, you may be able to find (on some bedknives) a small area outside the wear area to determine the top face angle.

### Reset the Grinding Head Angle Dial

Reset the grinding head angle dial to 0 degrees. See FIG. 41. Note that you are only moving the dial ring, not changing the motor angle.

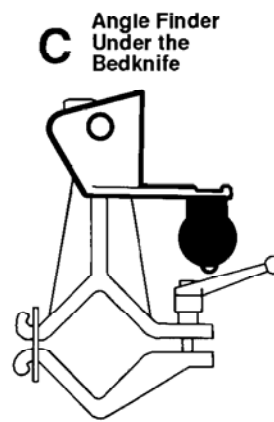


FIG. 35

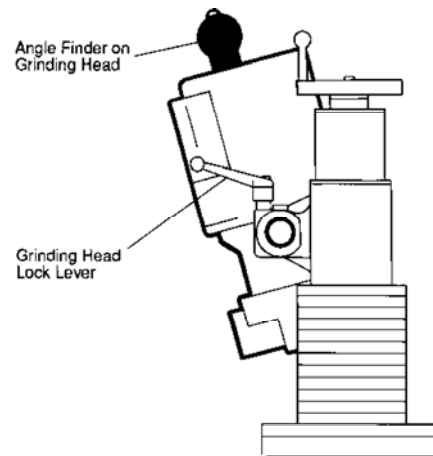


FIG. 36

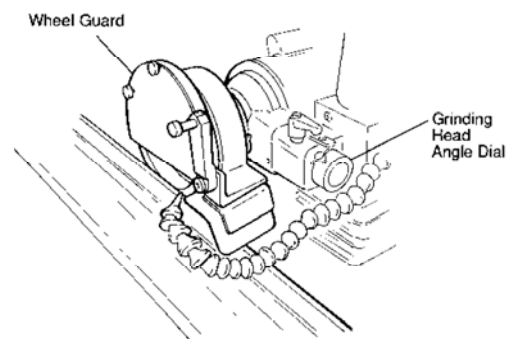


FIG. 37

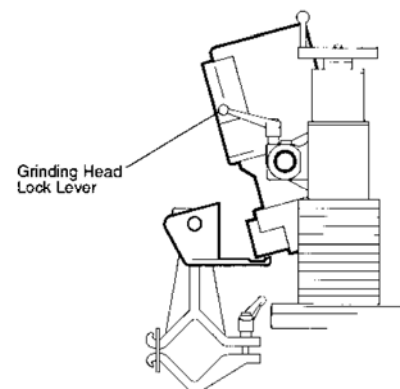


FIG. 38



# OPERATING INSTRUCTIONS (Continued)

## GRINDING THE TOP FACE (Continued)

### Check Clearances and Set Traverse Limits

Reposition the grinding head so that the grinding wheel just touches the top face of the bedknife and (if possible) the wheel rim extends 1/2" [13 mm] over the bedknife top surface. See FIG. 39.



**IF THE GRINDING WHEEL RIM DOES NOT EXTEND OVER THE BEDKNIFE FACE, IT WILL WEAR UNEVENLY AND CAUSE GROOVES ACROSS THE TOP SURFACE OF THE BEDKNIFE.**

Check for interference:

1. Raise the grinding head so the wheel no longer touches the top face of the bedknife.
2. Slide the left and right proximity switches to the far ends of the rail. Leave their knobs loose.
3. Set the TRAVERSE knob at 4 - 5 FT/MIN. Set the CARRIAGE TRAVERSE switch ON. Traverse the carriage to the right until the contact area of the grinding wheel is about 1" beyond the area to be ground on the bedknife, then press STOP. Be prepared to STOP the traverse earlier if there is any interference between the wheel guard and the middle and right bedknife supports.

With the carriage still in the position determined in Step 3 above, slide the right proximity switch in until its LED lights, then tighten the switch knob.

Traverse back to the left until the grinding wheel reaches the point where it covers the entire area to be ground - and go past that point by 2" [50 mm] if possible. Then set the proximity switch in the same manner.

**NOTE:** The area of the grinding wheel which contacts the bedknife is on the left side of the motor. The area of the wheel which doesn't contact will still be over the bedknife. See FIG. 40. (When you go to the right end of the Grinder, the wheel traverses completely off the bedknife.)

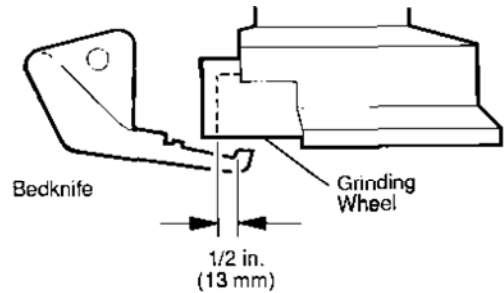


FIG. 39

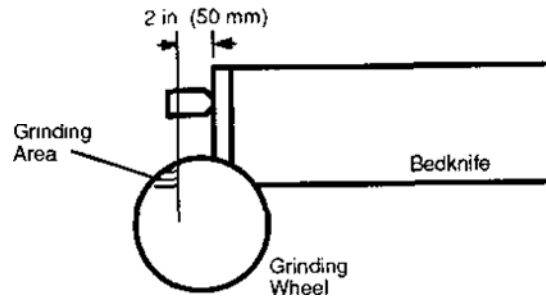


FIG. 40

# OPERATING INSTRUCTIONS (Continued)

## GRINDING THE TOP FACE (Continued)

### Grind the Bedknife

When you are satisfied with the grinding head travel, begin grinding:



**REFER ALSO TO THE "SAFETY RULES WHEN GRINDING" ON PAGE 3.**

**NOTE:** At this point you won't know the condition of the grinding wheel after the previous job. Always dress the wheel before grinding. See Page 12.

1. Set the GRINDING WHEEL switch at ON.
2. Set the COOLANT PUMP switch at ON, and check that the nozzle is directing coolant onto the bedknife. See FIG. 18.
3. Set the TRAVERSE knob at about 12 FT/MIN.
4. Determine which is the high side of the bedknife, and be sure the head will clear that side when it traverses.

**NOTE:** If the bedknife is badly worn, you may want to move the centers (on the bedknife supports) out of alignment, to avoid removing excessive metal stock from one end of the knife. Use the alignment lever on the fixed support to move the left end of the knife up or down as desired. The center has an adjustment range of  $\pm 0.125$ " [3.2 mm]. See FIG. 41.

**NOTE:** If an excessive amount of metal stock will have to be removed on one end, also recheck the straightness of the bedknife. If it is bowed or twisted, replace it.

5. Set the carriage traverse switch at on. With the vertical handwheel, crank the head down (counter clockwise) until the grinding wheel is removing metal lightly from the bedknife. We recommend taking off about .002 to .003" [.05 to .075 mm] per pass during the rough grind.

**NOTE:** The vertical adjustment dial is calibrated in .001" [.025 mm] increments.

6. Check again where the grinding wheel is actually touching the bedknife. If you want to match the angle more precisely to the top face, adjust the angle of the wheel slightly by changing the angle of the grinding head.

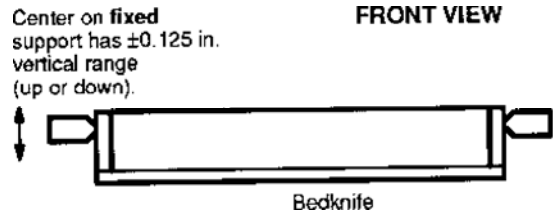


FIG. 41

## OPERATING INSTRUCTIONS (Continued)

### GRINDING THE TOP FACE (Continued)

7. Continue grinding the bedknife in this manner until the rough grind is completed.

During the grinding process, watch the spark pattern for the full length of grind - the sparks should look equal for the full length.

8. Dress the wheel before making the final grind. See Page 12 for more information on dressing.

On the spark out passes, crank the grinding head down (counter-clockwise) only about .001" [.025 mm] and then let the grinding wheel spark out. For sparking out, always traverse the grinding head 10 - 20 passes without cranking the grinding head down further. To get the finest top-face grind, set the TRAVERSE knob at slow speed (about 5 FT/MIN) for this final grinding sparkout.

**NOTE:** What you are looking for is a "near sparkout" - about a 99% reduction in grinding spark from a normal grind. Don't continue sparking out until you have **no sparks**, because this could be an extremely long time.



**SHUT OFF THE COOLANT PUMP SWITCH BEFORE YOU SHUT OFF THE GRINDING WHEEL, TO ALLOW THE WHEEL TO SPIN DRY. IF THE WHEEL RETAINS TOO MUCH COOLANT, IT WILL BE UNBALANCED WHEN YOU AGAIN TURN ON THE GRINDING MOTOR.**

#### Check the Straightness of Grind

Straightness of grind is important. If you grind a low spot into the bedknife, you will have to excessively lap the high points to correctly match the bedknife to the reel blade.

After sparkout, check the straightness of the top face. Use the **optional** Dial Indicator: See FIG. 42.

**NOTE:** You can also check straightness by using a precision straightedge with a feeler gauge - but the dial indicator is easier to use because it gives you a direct reading.

1. Hold the dial indicator's magnetic base against the left side of the vertical column, and turn the magnet lock knob ON.

Adjust the indicator's linkages so the indicator arm is touching the **outer** edge of the ground surface of the bedknife. See FIG. 42. Use the fine adjustment screw for final positioning.

2. Reset the indicator to zero by turning the outside ring of the dial.
3. Watch the indicator while you traverse the carriage across the Grinder.

The indicator reading should not vary more than:

- \* .001" [.025 mm] within any 12" [300 mm] section; or
- \* .002" [.05 mm] across the full length of the bedknife.

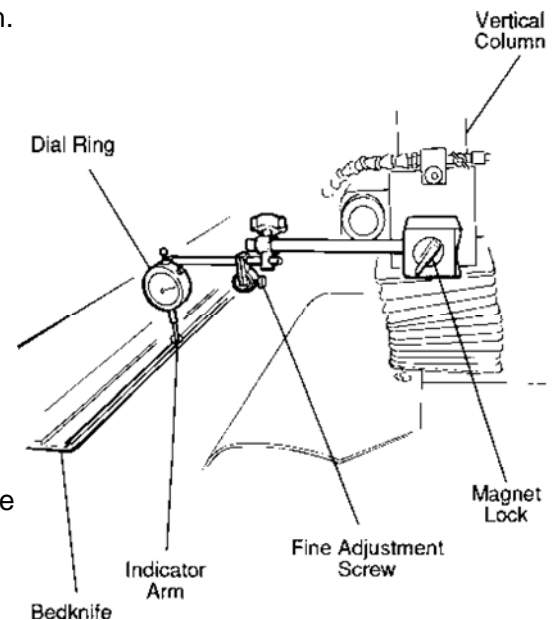


FIG. 42

# OPERATING INSTRUCTIONS (Continued)

## GRINDING THE FRONT FACE

**NOTE:** On some mower bedknives, the front face is curved and therefore may not have to be sharpened.

### Reposition the Head for Front-Face Grinding

Set the head angle dial (under the vertical handwheel) to zero after the top face is ground. Then pivot the grinding head so it is in position to grind the front face:

1. Traverse the grinding head to the right end of the carriage (beyond the end of the bedknife). See FIG. 43.
2. With the horizontal handwheel, crank the grinding wheel back from the top face of the bedknife until there is enough clearance to pivot the head.
3. Loosen the grinding head lock lever and rotate the head to the horizontal position. See FIG. 44.

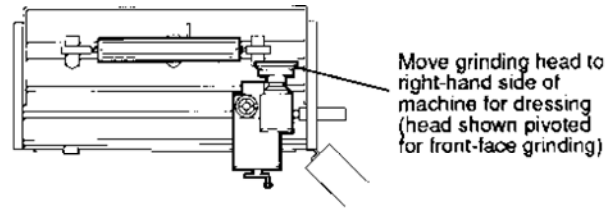


FIG. 43

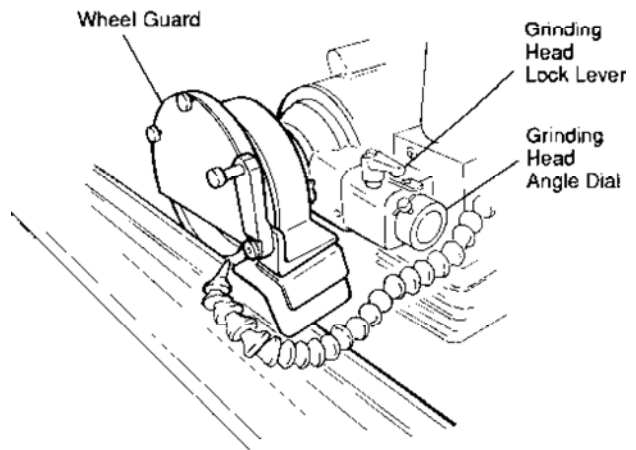


FIG. 44



**THE HEAD IS HEAVY AND MUST BE SUPPORTED WHEN THE LOCK LEVER IS RELEASED.**

4. Reset the wheel guard as shown by loosening its two T-knobs and swinging the guard around 180 degrees so the wheel can grind the front face of the bedknife. Align the T-knob to the arrow on the motor flange. Be sure there is **no gap** between the grinding wheel guard and the motor flange, then tighten the T-knobs. See FIG. 17.

### Adjust the Grinding Wheel Angle

Set the front face angle: loosen the lock lever and rotate the grinding head to the relief angle specified by the reel manufacturer (or match to the existing angle already on the bedknife). See also "Bedknife Grinding Angles" on Page 10.

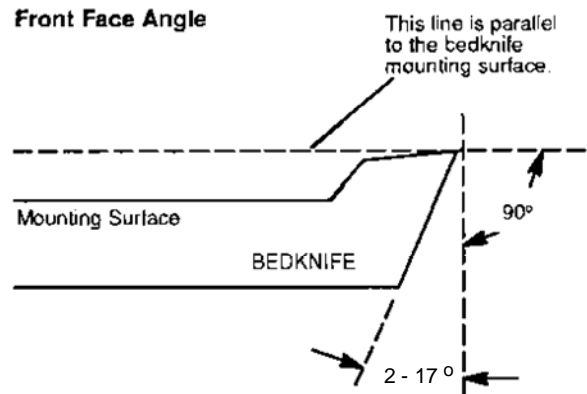


FIG. 45



**THE HEAD IS HEAVY AND MUST BE SUPPORTED WHEN THE LOCK LEVER IS RELEASES.**

**NOTE:** There is usually a 2 - 17 degree bevel clearance ground into the front face. See FIG. 45. Refer to the mower manufacturer's specifications for the correct bevel clearance for the bedknife model, and for the reference plane to measure from.

## OPERATING INSTRUCTIONS (Continued)

### GRINDING THE FRONT FACE (Continued)

#### Move the Wheel Into Position

With the vertical handwheel, crank the grinding head so the wheel rim extends below the front edge to be ground. See FIG. 46.

Turn the vertical and horizontal handwheels until the grinding wheel just touches the front face of the bedknife. Then back off the grinding wheel until it is no longer touching the face.

#### Grind the Bedknife



**REFER ALSO TO THE "SAFETY RULES WHEN GRINDING" ON PAGE 3.**

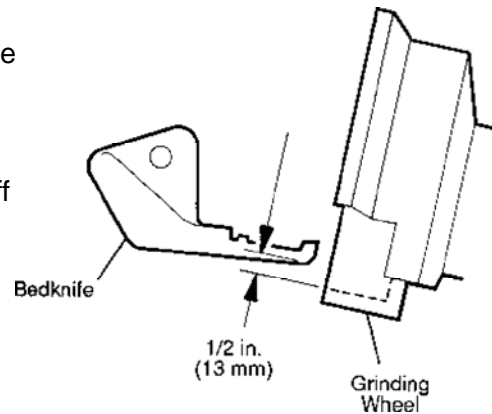


FIG. 46

1. Set the GRINDING WHEEL switch at ON.
2. Set the COOLANT PUMP switch at ON, and check that the nozzle is directing coolant onto the bedknife. See FIG. 19.
3. Set the TRAVERSE knob at about 12 FT/MIN.
4. Determine which is the high side of the bedknife, and be sure the head will clear that side when it traverses.

**NOTE:** If the bedknife is badly worn, you may want to move the centers (on the bedknife supports) out of alignment, to avoid removing excessive metal stock from one end of the knife. Use the alignment lever on the adjustable support to move the right end of the knife forward or back as desired. The center has an adjustment range of  $\pm 0.125$ " [3.2 mm]. See FIG. 47.

**NOTE:** If an excessive amount of metal stock will have to be removed on one end, also recheck the straightness of the bedknife. If it is bowed or twisted, replace it.

Determine the high end of the bedknife, and be sure the grinding head will clear it. Crank the head until the wheel is removing metal lightly from the bedknife. We recommend taking off about .002 to .003" [.05 to .075 mm] per pass. When the head is horizontal, rotating the horizontal handwheel 7 degrees will remove about .002 per pass.

Continue grinding the bedknife in this manner until you are satisfied with the front face grind. Dress the wheel when necessary (see "Dressing the Grinding Wheel" on Page 12).



**SHUT OFF THE COOLANT PUMP SWITCH BEFORE YOU SHUT OFF THE GRINDING WHEEL, TO ALLOW THE WHEEL TO SPIN DRY. IF THE WHEEL RETAINS TOO MUCH COOLANT, IT WILL BE UNBALANCED WHEN YOU AGAIN TURN ON THE GRINDING MOTOR.**

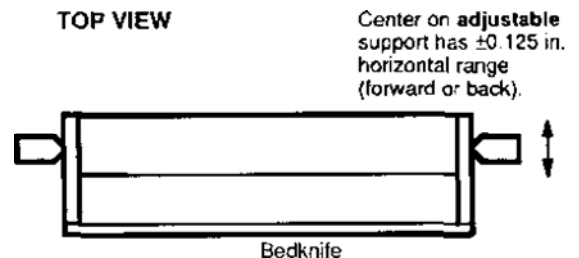


FIG. 47

### REMOVING THE BEDKNIFE

Unlock the center locking knobs, and screw back both centers.

If the next bedknife is the same length, just mount it and screw out the centers to secure it. Don't move the adjustable (right) support unless the next bedknife is a different length.

