

# Rockwell

PM- 408-01-651-5003

Pittsburgh, Pa.

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## **ROCKWELL/DELTA TOOLMAKER GRINDER**

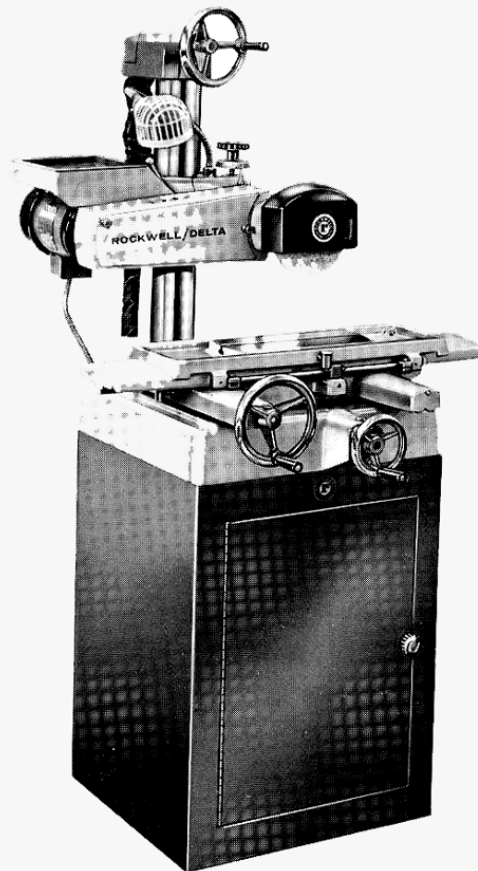
**TOOLMAKER TOOL AND CUTTER GRINDING MACHINE**

**TOOLMAKER SURFACE GRINDING MACHINE**

**TOOLMAKER CHIP BREAKER GRINDING MACHINE**

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### **INTRODUCTION**

The following instructions will give you an explanation of installation, operating controls, service adjustments, lubrication, and maintenance for the Toolmaker Surface Grinding Machine.

This manual, plus the Rockwell instruction manual covering the 24-822 Tool and Cutter Grinding Attachment will be sufficient for use with the Toolmaker Tool and Cutter Grinding Machine.

This manual, plus the Rockwell instruction manuals covering the 24-902 Univise and the 24-823 Coolant Attachment are sufficient for use with the Toolmaker Chip Breaker Grinding Machine.

## INSTALLATION

Selecting Floor Space — Vibration transmitted through inadequately constructed floors by adjacent machinery or other source can impair the accuracy of your machine. Therefore, it is of the utmost importance that the grinder be mounted to a solid, level foundation, preferably concrete. Four anti-vibration pads are supplied and should be positioned under each corner of your grinder.

Unless substantially constructed, a wood floor should be braced against sagging and transmission of vibration.

Refer to Fig. 1, for floor plan dimensions for your grinder.

## CLEANING THE GRINDER

The ways and all other machined and unpainted surfaces of the grinder are protected with a coating of rust preventive. This coating may be removed with a soft cloth moistened with kerosene (do not use acetone, gasoline or lacquer thinner for this purpose.) A strip of Teflon tape is supplied on the saddle ways which should NOT BE REMOVED. After cleaning, cover all unpainted surfaces with a light film of good machine oil.

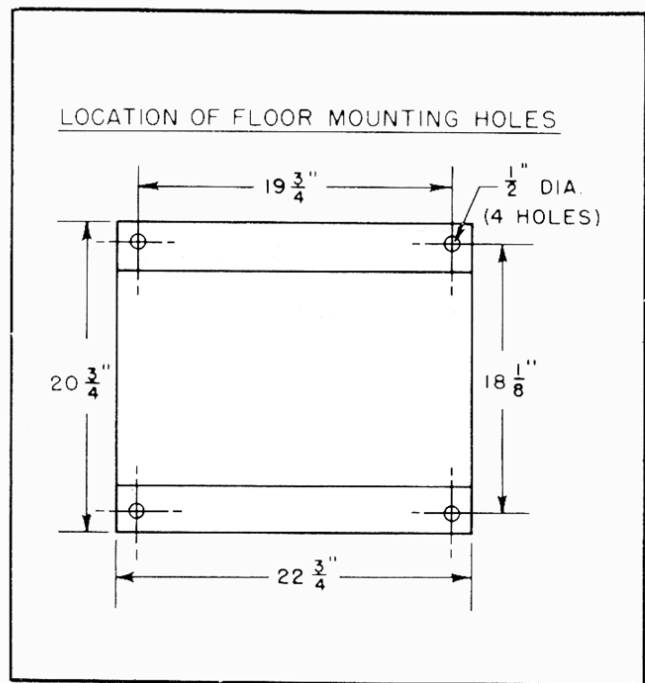


Fig. 1.

## LEVELING SCREW ADJUSTMENTS

The most important adjustment to your Toolmaker Grinder is to "level" the base of the grinder on the steel cabinet. This is done at the factory but needs to be checked again at the time of installation. It's not a case of leveling as with a spirit level or plumb line. The idea is to get the strain out of the base, and to get the base, cross slide, and table, all "married" to each other. To do this proceed as follows:

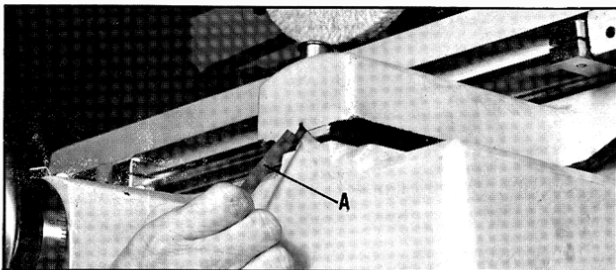


Fig. A

1. Move cross slide toward the column to the extreme end of its travel. Then back the cross slide away from the column using one full counter-clockwise revolution of the cross feed handwheel.
2. Center the table on the cross slide.
3. Using a .001" feeler gage, (A), check to see if the feeler enters more than 1/8" at the front end of the "V" way, as shown in Fig. A. Check both sides of the "V" way.

4. Without moving the cross slide or table, check the flat way at the left front as shown in Fig. B, to see if the .001" feeler (A) Fig. B enters more than 1/8".

5. Move cross slide away from the column by turning the cross feed handwheel counter-clockwise. Then check the rear "V" way and rear flat way, by following the same procedure used when checking the front "V" way and flat way.

6. If the feeler gage enters more than 1/8" at any position an adjustment is necessary. To adjust proceed as follows:

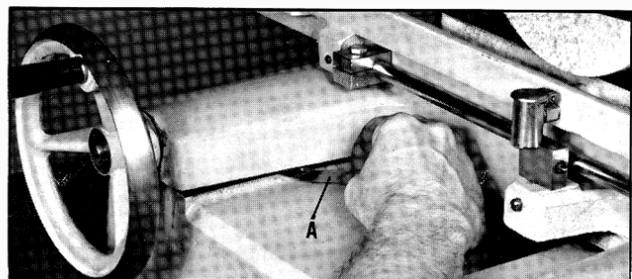


Fig. B

7. Be sure the two front hex head screws, that hold the base to the cabinet, are snugged up, but not pulled down as tight as you can get them.

8. If the feeler gage enters more than  $1/8''$  at the right front or right rear of the cross slide "V" way, loosen the hex head screw (A) Fig. C, and turn the right rear leveling screw (B) Fig. C until all excess gap is removed.

9. If the feeler gage enters more than  $1/8''$  at the left front or left rear of the flat way, loosen the hex head screw (C) Fig. C, and turn the left rear leveling screw (D) Fig. C, until all excess gap is removed.

10. When you are certain that the feeler gage will not go between the "V" way and flat way at any position the unit is properly levelled and the two hex head screws (A) and (C) Fig. C, should be snugged up. Recheck and adjust further if necessary.

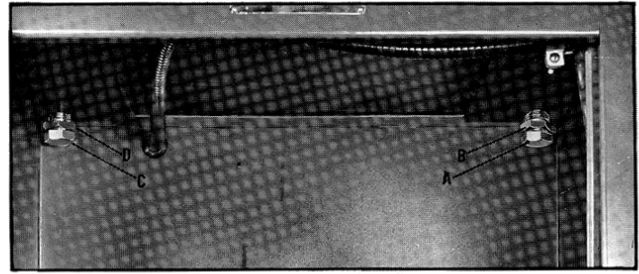


Fig. C

## NOMENCLATURE CHART

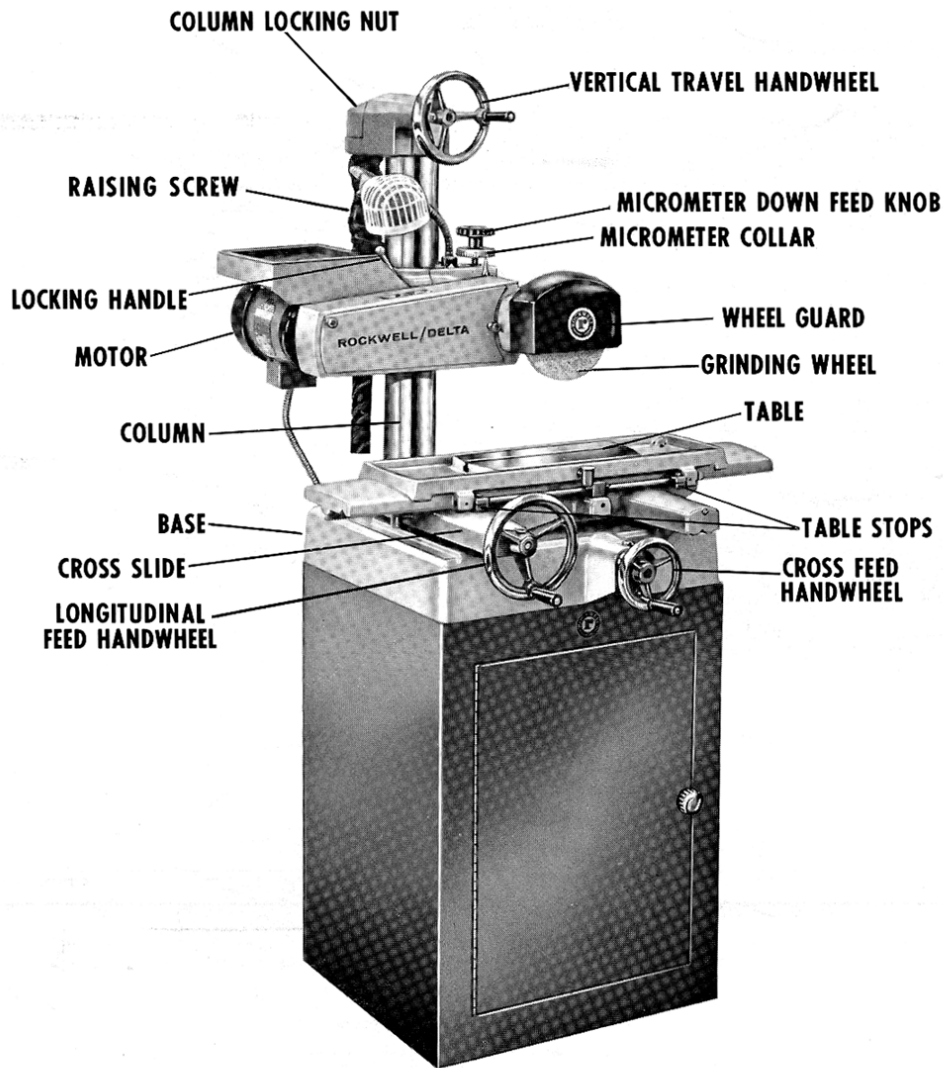


Fig. 2.

## COLUMN AND HEAD CONTROLS

The heavy cast iron column is precision ground for accuracy and is capable of rotating through a full  $360^{\circ}$ , just by loosening the column locking nut at the top end of the column. Match marks are provided on the flange at the base of the column, and on the base, as shown in Fig. 3, to show the proper setting when it is desired to have the spindle square with the table ways. BE SURE THAT THE COLUMN LOCKING NUT IS DRAWN DOWN TIGHTLY WHEN THE MACHINE IS IN OPERATION. When doing tool and cutter grinding, it is customary to rotate the column two or three degrees away from the square setting in order to provide wheel clearance.

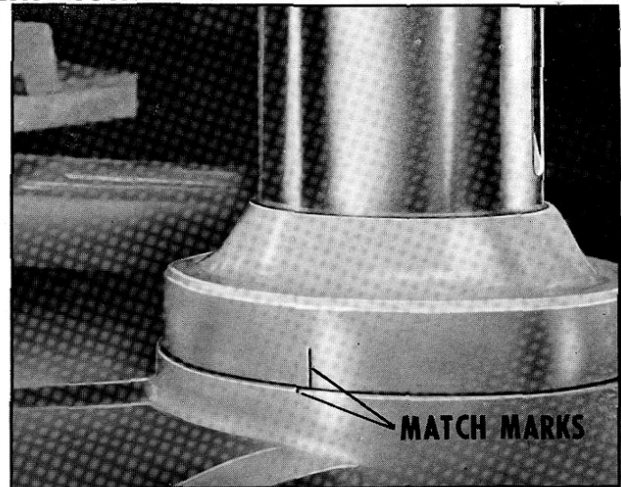


Fig. 3.

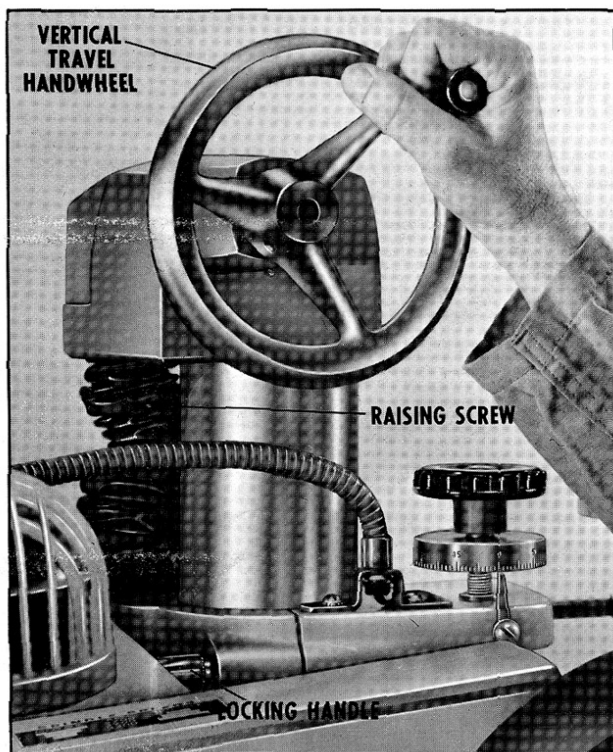


Fig. 4.

The micrometer collar on the down feed screw can be adjusted for slip action to provide a zero start e.g., the micrometer collar can be moved without moving the down feed settings. The micrometer collar can also be locked securely, to insure that it will not be moved accidentally. This adjustment is made by tightening or loosening the set screw (under which a nylon drag plug is provided) in the micrometer collar. The full vertical travel with the Micrometer Down Feed Knob is  $5/8$  of an inch.

The vertical travel handwheel and the raising screw are intended for fast or major adjustments, as shown in Fig. 4, after which the sliding column bracket is locked by the locking handle during set-up. DO NOT GRIND WITH THIS LOCKING HANDLE LOOSE. The vertical feed of the machine is then controlled by the Micrometer Down Feed Knob, as shown in Fig. 5, which has a micrometer screw having a hardened steel ball point that presses against a hardened pad, and an adjustable micrometer collar with accurate calibrations of  $.0005''$ .

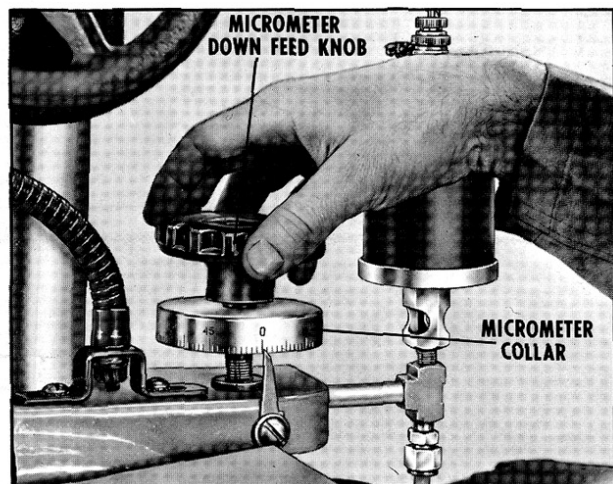


Fig. 5.

The spindle shown in Fig. 6, is precision ground and balanced and is mounted on preloaded precision ball bearings for extreme accuracy.

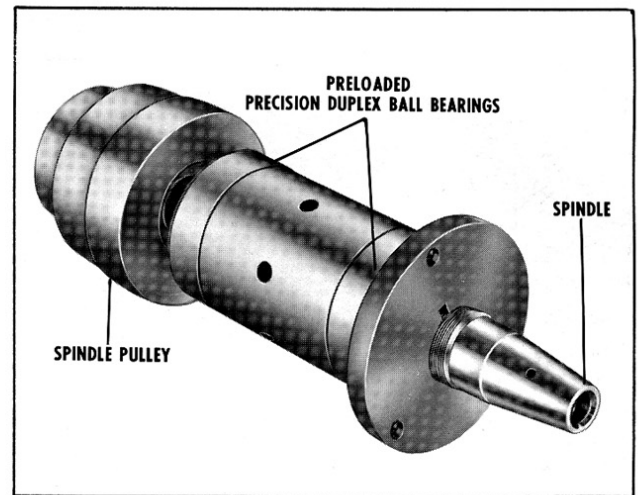


Fig. 6.

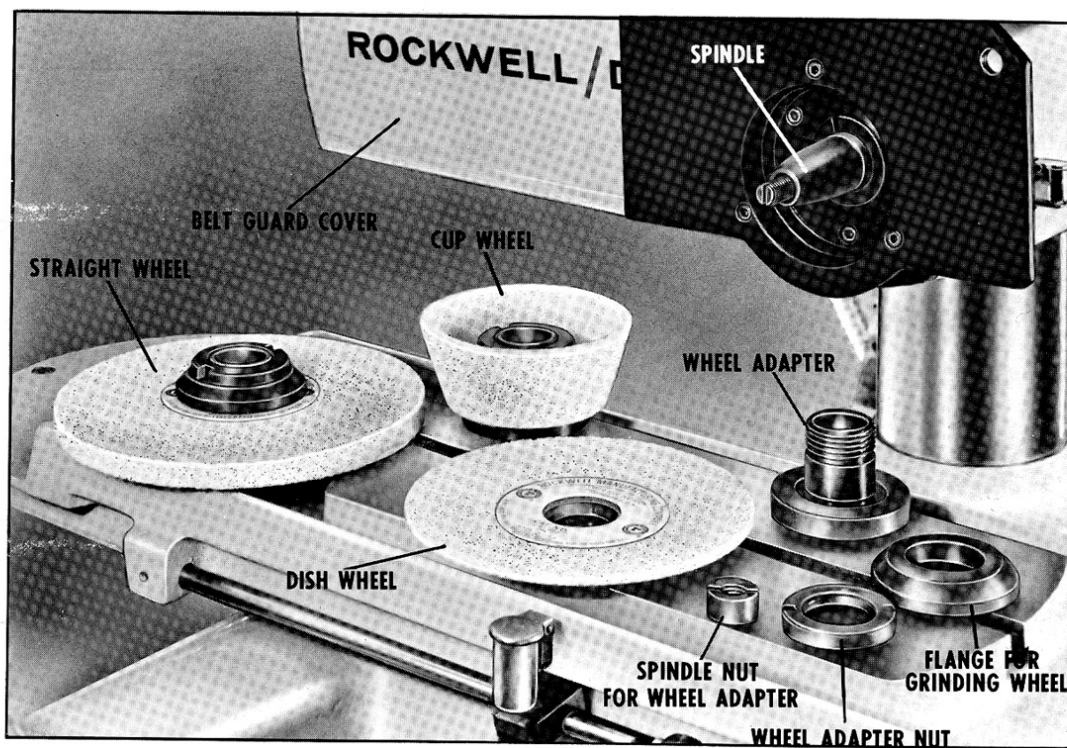


Fig. 7.

The wheel adapter, Fig. 7, is fitted to the tapered spindle nose. Both the spindle nut and wheel adapter nut, as shown in Fig. 7, have left hand threads.

Two flanges, one  $2 \frac{15}{32}$ " O.D. and one  $2 \frac{7}{32}$ " O.D., are provided with the wheel adapter but only one or the other is used depending upon the wheel being mounted. Use the larger flange, ( $2 \frac{15}{32}$ " O.D.) whenever possible, however, the smaller flange ( $2 \frac{7}{32}$ " O.D.) must be used for cup wheels which do not have enough room for the larger flange.

A wheel can be removed leaving the adapter in position, or it may be more satisfactory to remove the adapter and wheel together, so that a cen-

tered or dressed wheel can be re-fitted to the spindle without resetting or redressing. This is especially useful where diamond wheels are used.

When removing the adapter, shown in Fig. 7, from the spindle, use the special spanner wrench that comes with the unit, and merely loosen the small spindle nut a few turns so it extends beyond the spindle end; then gently, but sharply, tap the nut with a babbitt hammer or other soft material until the adapter is free from the taper. Do not try to pry the adapter loose, and take care that the tapered surfaces are not nicked or dented.

When changing wheels the wheel guard simply flips up out of the way.



## TABLE AND CROSS SLIDE CONTROLS

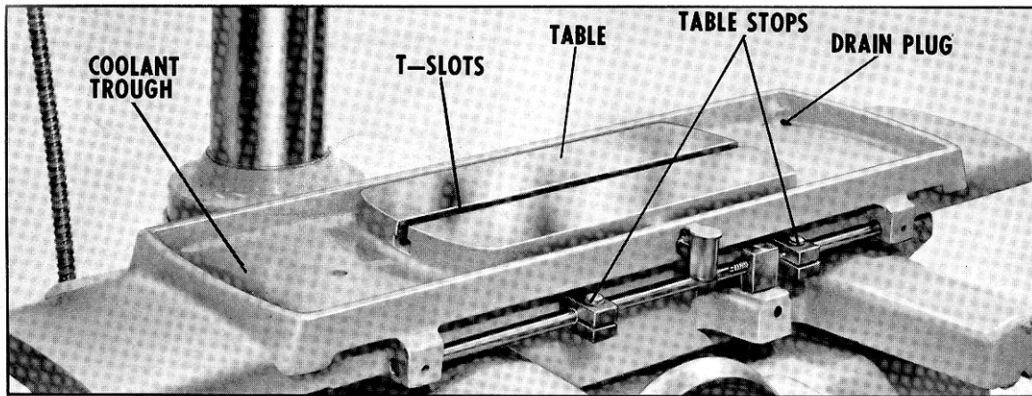


Fig. 8.

The Grinder grinds its own table, Fig. 8, after the final vibration check-run procedure at the factory. This assures that the table is true to the spindle.

The table surface finish so produced is held to a maximum roughness of 16 microinches. The surface area of the table is 5 3/4 x 13" and T-Slots are provided in the table to facilitate clamping of work and to permit easy mounting of work holding fixtures. The table is provided with a coolant trough Fig. 8, all the way around the table and a tapered drain plug.

The table has a 13 1/2" longitudinal travel by means of a rack and pinion, with adjustable table stops to restrict the travel in either direction. These table stops are not intended for use as a positive stop for the grinder table, nor are they used for surface grinding. The table stops are, however, recommended for use in tool and cutter grinding. The purpose of the stops in tool and cutter grinding is to remind the operator that the table has been moved lengthwise far enough to safely index to the next tooth on the cutter. **DO NOT HIT THE TABLE STOPS TOO HARD AT THE END OF TABLE TRAVEL.**

To locate the work in a definite relation with the grinding wheel, it is necessary to move the table longitudinally or transversely. Each of these movements is controlled by a handwheel which can be reached easily from the front of the machine.

Lengthwise or longitudinal movement of the table is accomplished by turning the longitudinal feed handwheel, Fig. 9.

Crosswise or transverse movement of the table is accomplished by turning the cross feed handwheel, Fig. 9, which is mounted on the end of the cross feed screw, and has an adjustable micrometer collar with accurate calibrations of .001". One revolution of the cross feed handwheel moves the slide .100 inch.

The micrometer collar on the cross feed screw can be adjusted for slip action to provide a zero start, e.g., the micrometer collar can be moved without moving the cross feed setting. The micrometer collar can also be locked securely, to insure that it will not be moved accidentally. This adjustment is made by tightening or by loosening the set screw (under which a nylon drag plug is provided) in the micrometer collar.

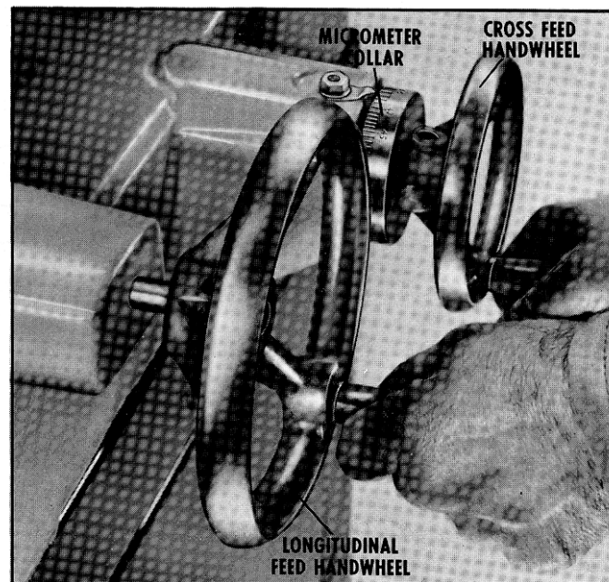


Fig. 9.

When grinding small pieces the position of the handle of the longitudinal feed handwheel can be changed by simply pulling out, rotating, and re-engaging the handwheel for a more convenient position of the handle. Fig. 9 shows the handwheel shaft pulled out during the process of repositioning the handle.

## SPINDLE SPEEDS

With a 3450 rpm motor, spindle speeds of 3300, 3700, and 5600 rpm can be obtained. To change spindle speeds, simply remove belt guard cover as shown in Fig. 10, and position the belt on the correct steps of the pulleys. Refer to the spindle speed chart found on top of belt guard. CAUTION: DO NOT RUN WHEELS FASTER THAN RECOMMENDED SPEED SHOWN ON THE WHEEL.

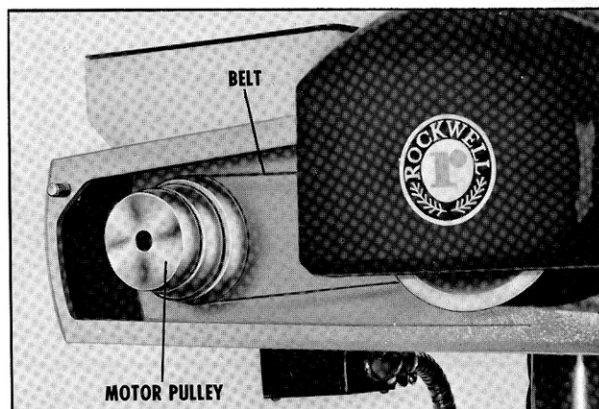


Fig. 10.

## GRINDING WHEELS

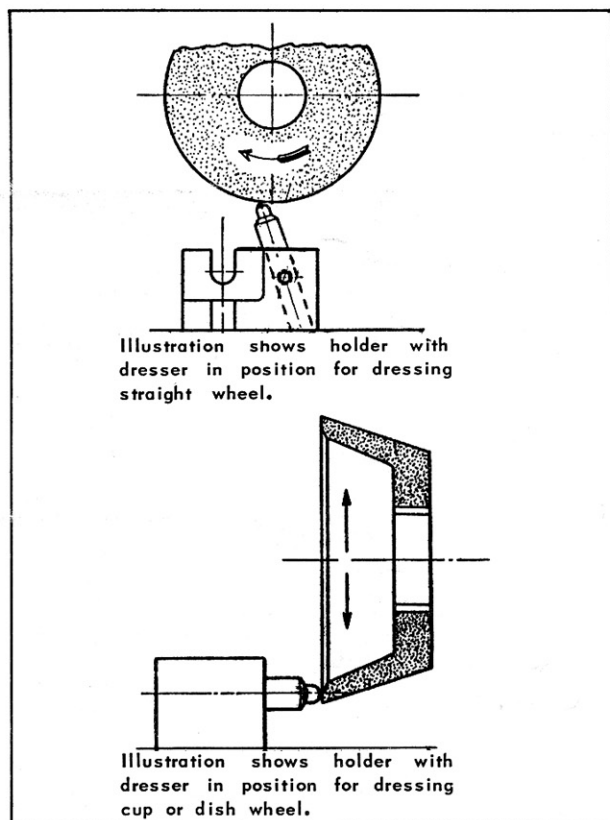


Fig. 11.

Particular care should be taken to place the holder in proper position when dressing wheel. The proper position for the diamond point of the wheel dresser is in front of the center line of the wheel, see Fig. 11.

Only a limited choice of grinding wheels is offered by us. In order to obtain the most efficiency from a wheel for production work, we suggest you contact the local representative of some reliable abrasive company in order to obtain the proper wheel for your purpose.

Always place wheel guard in position before starting up grinding wheel. Balanced wheels should always be specified.

ALWAYS DRESS A WHEEL BEFORE GRINDING using the Diamond Holder, furnished with basic machine, and the Cat. No. 24-805 Diamond Wheel Dresser, available as an accessory. The wheel dresser holder is made so it can be used for dressing straight wheels, cup wheels, and dish wheels. When used for straight wheels, the table should be locked by bringing both table stops against the center spring loaded stop. Move the cross slide and vertical travel handwheel until the diamond just touches the high point of the face of the wheel. Then dress the wheel by moving the cross slide back and forth. Lower the grinding wheel a few thousandths, using the micrometer down feed knob, and dress the wheel back and forth by moving the cross slide. Repeat the above steps until the face of the wheel is clean and the corners are square. Then lower the grinding wheel one thousandth (or two marks) on the micrometer collar of the down feed knob and pass the diamond once rapidly across the face of the wheel.

When dressing cup wheels and dish wheels, the table should be locked and the dresser adjusted to the wheel by moving the cross slide and elevating handwheel until the diamond just touches the high point of the face of the wheel. The wheel is then fed down across the diamond and back by using the micrometer down feed knob. Continue feeding the cross slide "in" and dressing the wheel by lowering and raising the wheel using the micrometer down feed knob until the face of the wheel is clean and completely dressed. Then move the cross slide in one thousandth of an inch and lower the micrometer down feed knob to bring the face of the wheel once across the diamond.

## MOTORS AND PULLEYS

To insure the maximum efficiency of the Rockwell-Delta Toolmaker Grinder, it is offered complete with a motor.

The motor, motor pulley and spindle pulley, are each independently dynamically balanced. In addition, when the spindle is being "run in" and the table ground, the motor and motor pulley as a unit are balanced on the grinder, and this unit is then shipped with that machine.

It is important therefore that the motor and motor pulley are not separated.

Available as service accessories for your grinder are the Cat. No. 24-800 1/2 HP Single Phase Motor with motor pulley and 49-085 Belt balanced together for field installation, and the Cat. No. 24-801 1/2 HP Three Phase Motor with motor pulley and 49-085 Belt balanced together for field installation.

## SERVICE ADJUSTMENTS

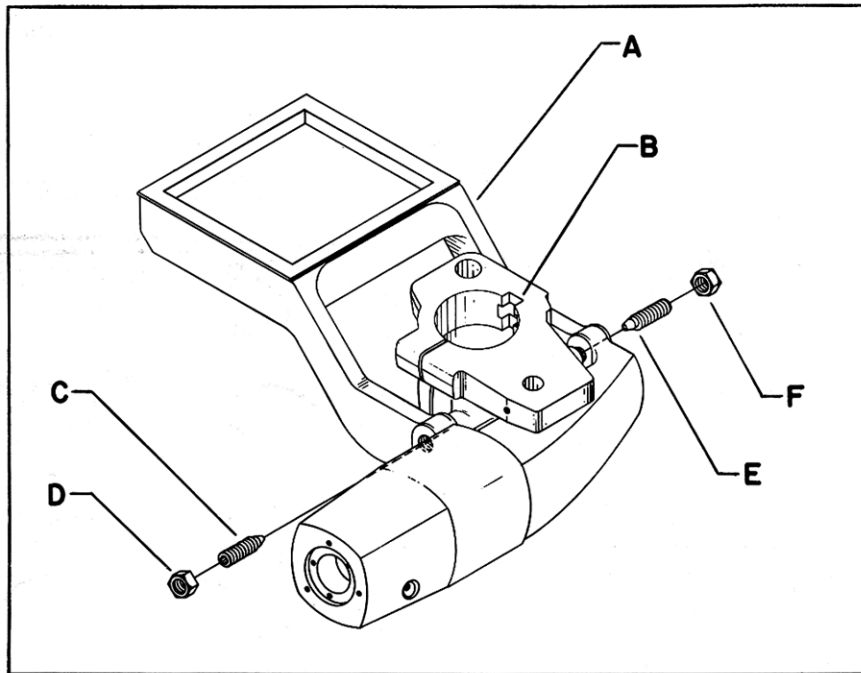


Fig. 12.

### ADJUSTING PIVOT SCREWS

Before the grinder is placed into service, be sure the pivot screws are adjusted so that there is no play between the Spindle Housing and Motor Bracket Casting (A) Fig. 12, and the Column Sliding Bracket (B).

This adjustment is made at the factory, but should be checked because of the possibility of rough handling in transit.

"Play" is removed by tightening the front concentric cone point pivot screw (C) Fig. 12, after loosening the jam nut (D). The rear eccentric cone point pivot screw (E) should not be disturbed when removing play, as this would throw the spindle out of parallel with the surface of the table.

The spindle can be adjusted in a vertical plane by turning the rear eccentric pivot screw (E) Fig. 12, always less than  $360^{\circ}$ . This is done to purposely tilt the grinding wheel slightly for wheel clearance when grinding a vertical plane surface, or to adjust the spindle to make it parallel with the table surface, as it should be for normal grinding.

After adjusting the spindle in a vertical plane, always lock the jam nut (F) Fig. 12, first on the rear eccentric pivot screw (E) and then remove all play by adjusting and locking the front pivot screw (C).



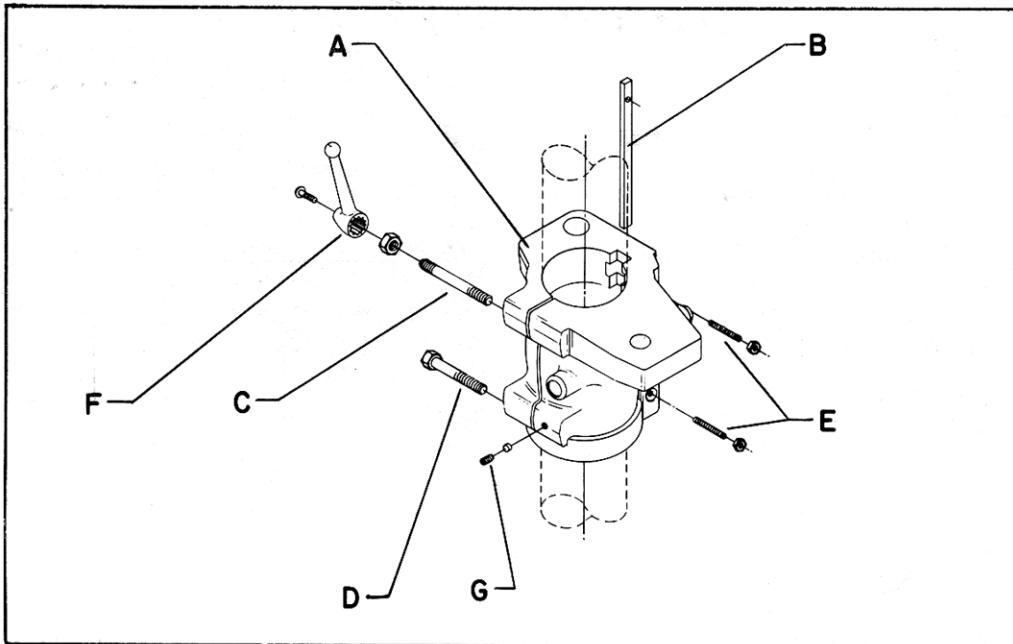


Fig. 13.

### ADJUSTING COLUMN SLIDING BRACKET AND COLUMN GIB

Adjustments to the Column Sliding Bracket (A) Fig. 13, and the Column Gib (B) have been made at the factory, however, due to rough handling in transit or after considerable use, the Column Sliding Bracket (A) and Column Gib (B) may have to be adjusted as follows:

1. Loosen both upper and lower bolts (C and D) Fig. 13. NOTE: Before loosening lower bolt (D) make sure set screw (G) is first loosened.

2. Adjust the gib (B) Fig. 13, by adjusting the two gib adjusting screws (E) until a good, snug, sliding fit is obtained.

3. Then adjust the column sliding bracket so it is free from any looseness. This is done by properly adjusting and locking in position the lower locking bolt (D) Fig. 13.

4. Then adjust the upper locking bolt (C) Fig. 13, so that the handle (F) will be in a convenient position when locking the column sliding bracket to the column.

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### BELT TENSION AND BELT AND PULLEY ALIGNMENT

To increase tension on the belt, loosen the four nuts on the motor mounting bolts and move the motor away from the spindle. Care must be taken to keep the motor shaft in parallel alignment with the spindle. If the motor must be tilted to the front or rear, it is necessary to loosen the four nuts on the motor mounting bolts and adjust the motor until the motor shaft is parallel with the spindle. Then tighten the four motor nuts.

The motor pulley and spindle pulley must also be in alignment with each other in order that the belt rides fully and evenly on the pulley steps. If an adjustment is necessary, merely loosen the four motor mounting nuts and move the motor, with the pulley fastened to the motor shaft, to the front or rear until the steps of the pulleys line up with each other. Then tighten the four motor nuts.

## CROSS FEED SCREW END PLAY ADJUSTMENT

1. Remove special screw (A) Fig. 14 and screw (B) .

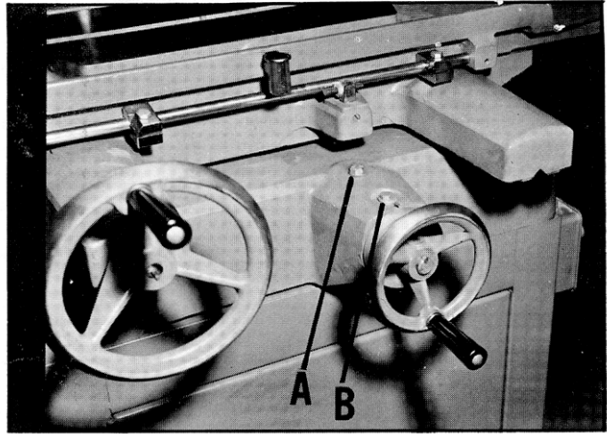


Fig. 14.

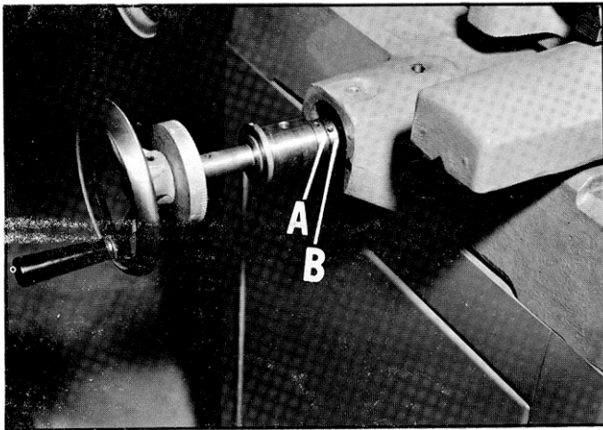


Fig. 15.

2. Turn cross feed handwheel counterclockwise until the two adjusting collars (A) and (B) Fig. 15, are accessible.

3. Adjustment is made by tightening or loosening the adjusting collar (A) Fig. 15, to the desired snugness and locking with the collar (B).

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## MAINTENANCE AND REPAIRS

### REPLACING SPINDLE, SPINDLE BEARINGS, AND SPINDLE PULLEY

The spindle and the spindle bearings are precision made and precision mounted and if it should ever be necessary to replace or repair them, they must be replaced together or returned to the factory where this precision work can be performed. Charges for the work will be based on current parts prices for each part replaced, plus a labor charge. Send the entire spindle assembly prepaid and insured to:

Rockwell Manufacturing Company  
Bellefontaine Division  
Bellefontaine, Ohio  
ATTENTION: Service Department

To remove the spindle, spindle bearings, and spindle pulley, proceed as follows:

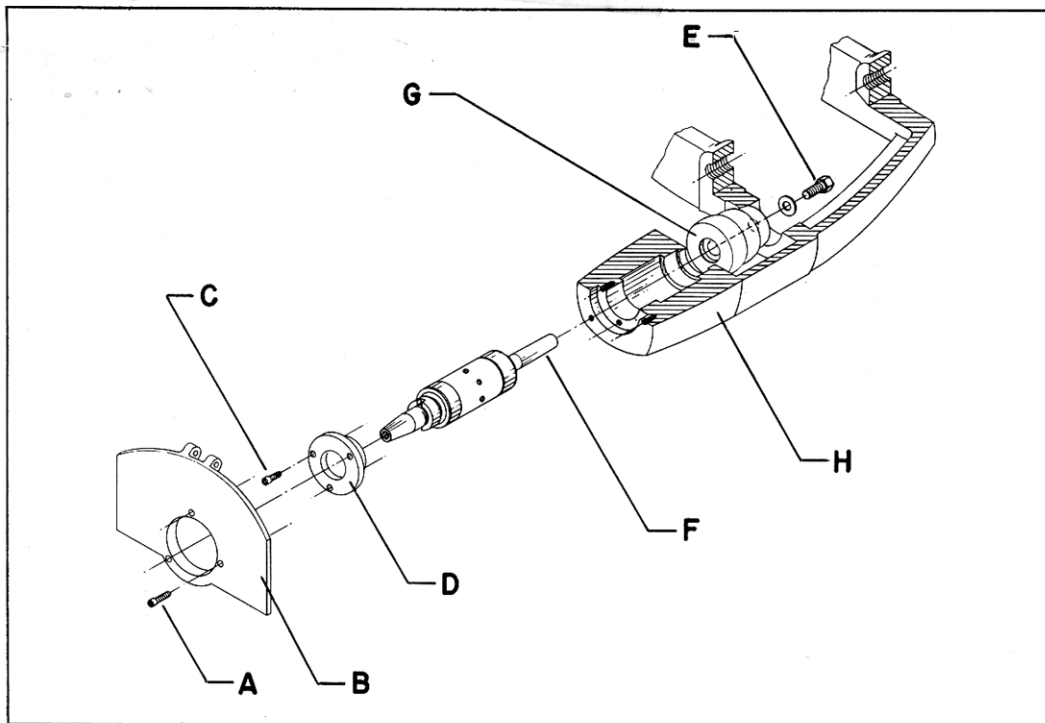


Fig. 16.

1. Remove the belt guard cover and the belt.
2. Raise the grinding wheel guard cover and remove the grinding wheel from the spindle.
3. Remove the three screws (A) Fig. 16, and remove the rear wheel guard (B) from the machine.
4. Remove the three screws (C) Fig. 16, and spindle retainer (D).
5. Loosen screw (E) Fig. 16, three or four turns.
6. Using long brass rod and a hammer, tap the screw (E) Fig. 16, until the spindle is free from the spindle pulley (G). This is necessary because the spindle and spindle pulley are tapered fit.
7. When the taper is broken, remove the screw (E) from the rear of the spindle. The spindle (F) can now be removed from the spindle housing (H) Fig. 16.
8. Remove the spindle pulley (G) from inside the belt guard.

## LUBRICATION

LUBRICATION CHART

PARTS TO BE LUBRICATED	RECOMMENDED OIL	METHOD OF FILLING	PERIOD OF CHANGE
SPINDLE BALL BEARINGS	ROCKWELL CAT. NO. 24-812 HIGH GRADE SPINDLE OIL OF VISCOSITY 58 TO 60 SAYBOLT AT 100° F.	*OIL CUP	ADD ONCE A WEEK OR AS NECESSARY - DO NOT OVERFILL
TABLE AND CROSS SLIDE	FOR BEST RESULTS USE ROCKWELL CAT. NO. 24-812 SPINDLE OIL OR ANY GOOD WAY OIL	OIL CUPS	DAILY
CROSS SLIDE SCREW	ALEMITE CUP GREASE	PUSH BACK DUST COVER	EVERY 30 DAYS
CROSS SLIDE SCREW BEARING	SAE #10	OIL FITTING	DAILY
PINION SHAFT BEARING	OILITE BUSHING, PRE- OILED		
VERTICAL SCREW & NUT	SAE #10	CLEAN AND OIL	WEEKLY
COLUMN	SAE #10	CLEAN AND OIL	DAILY
BEVEL GEARS ON TOP OF COLUMN	ALEMITE GREASE	**CLEAN AND GREASE	EVERY 30 DAYS

\* WHEN LUBRICATING SPINDLE BALL BEARINGS IT IS NECESSARY THAT THE GRINDER IS NOT RUNNING AND THAT THE SPINDLE IS AT ITS LOWEST POSITION BY TURNING THE MICROMETER DOWN FEED KNOB CLOCKWISE.

\*\* REMOVE CAP ON TOP OF COLUMN.

