DEPARTMENT

OF THE ARMY TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS LIST

FOR

LATHE, ENGINE, MOUNTED ON METAL CABINET BASE

MODEL 25-451-W/25-651

(3416-00-174-9171)

FEBRUARY 1984

HEADQUARTERS,
DEPARTMENT OF THE ARMY

Technical Manual

NO. 9-3416-244-14&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 17 February 1984

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2, located in the back of this manual direct to: Commander, US Army Armament, Munitions and Chemical Command, ATTN: DRSMC-MAS, Rock Island, IL 61299. A reply will be furnished directly to you.

Operator, Organizational, Direct Support and General Support Maintenance Manual Including Repair Parts List for:

Lathe, Engine, Mounted on Metal Cabinet Base
33 3/4 inches between centers
3/4 HP, 1 phase, 115 volts, 60 cycle,
In accordance with Federal Specifications OO-L125C dated
74 October

NOTE

This manual is published for the purpose of identifying an authorized commercial manual for the use of the personnel to whom this equipment is issued.

Manufactured by: Rockwell International
400 North Lexington Avenue
Pittsburgh, PA 15208
Procured under Contract NO. DAAA09-79-C-4349

INSTRUCTIONS FOR REQUISITIONING PARTS

NOT IDENTIFIED BY NSN

When requisitioning parts not identified by National Stock Number, it is mandatory that the following information be furnished the supply officer.

1 - Manufacturer's Federal Supply Code Number. 80318

2 - Manufacturer's Part Number exactly as listed herein.

3 - Nomenclature exactly as listed herein, including dimensions, if necessary.

4 - Manufacturer's Model Number. 25-451- W/25-651

5 - Manufacturer's Serial Number (End Item).

6 - Any other information such as Type, Frame Number, and Electrical Characteristics, if applicable.

7 - If DD Form 1348 is used, fill in all blocks except 4, 5, 6, and Remarks field in accordance with AR 725-50.

Complete Form as Follows:

(a) In blocks 4, 5, 6, list manufacturer's Federal Supply Code Number 80318 followed by a colon and manufacturer's Part Number for the repair part.

(b) Complete Remarks field as follows:

Noun: (nomenclature of repair part)
For: NSN: 3416-00-174-9171
Manufacturer: Rockwell International
25-451- W/ 400 North Lexington Avenue
Model:25-651 Pittsburgh, PA 15208
Serial: (of end item)

Any other pertinent information such as Frame Number, Type, Dimensions, etc.

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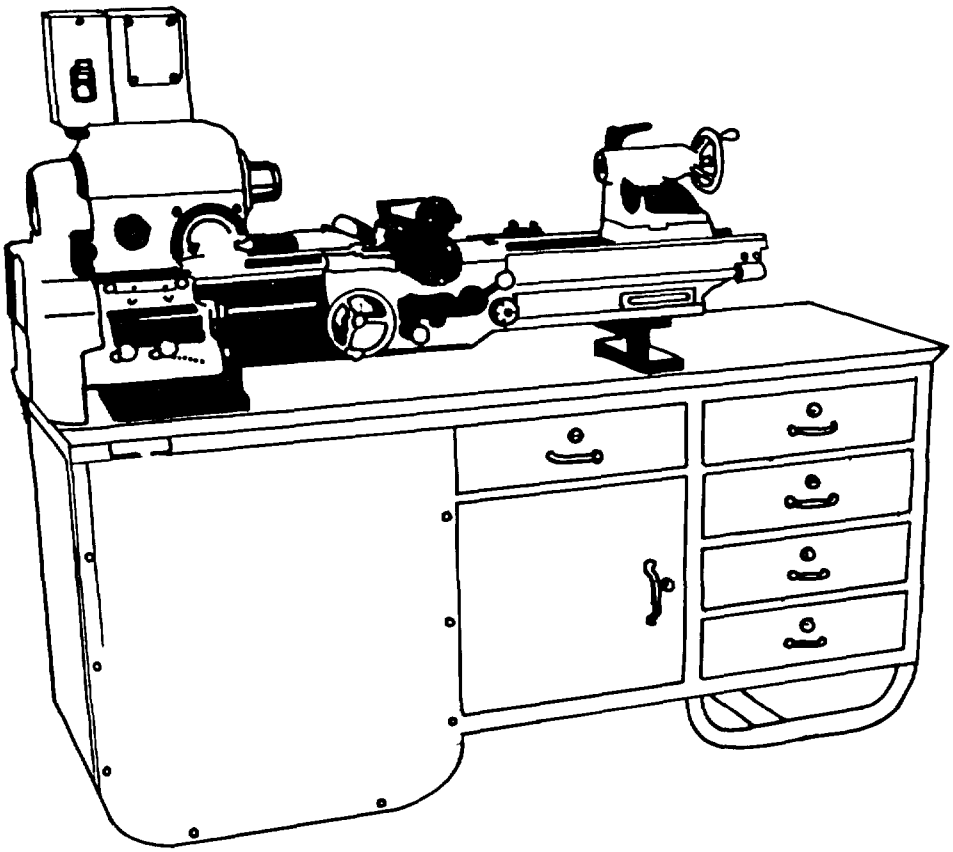
11" METAL CUTTING LATHE



INTRODUCTION

The Metal Cutting Lathe you have just purchased is a PRECISION MACHINE TOOL. Treat it as such by taking the time and care to see that it is properly installed and conscienciously maintained. You will find such time to be well spent and gain the benefits derived from keeping your lathe in perfect working condition for its entire life.

The machine was thoroughly aligned, tested and inspected. However, rough handling in shipment could throw the machine out of alignment and before being placed in operation it should be thoroughly checked and readjusted where necessary.

It is of the utmost importance therefore, that you review this entire manual before installing or operating your lathe so that you may become thoroughly familiar with the adjustments and functions of its various components.

Metal Lathes

PRECISION PERFORMING MACHINE TOOLS THAT ARE SAFETY ENGINEERED FOR INDUSTRY

Exclusive LVC 24-Volt Safety Control System. All Metal Lathes offer a low 24 volts at the magnetic control station for greater operator safety. . . 3-leg overload on three phase systems provides greater motor protection.

B. Modern Perfected Variable Speed Drive. Gives you all the advantages of a variable speed drive with an infinite choice of speeds from low to high range. An extra shaft between the variable speed drive pulley and the spindle on 11" and 14" models makes possible high speed power transmission while twin V-belts transmit steady power to the spindle.

C. Quick Operating Speed Selector. Variable speed drive utilizes a fast-acting lever for making speed changes quickly from low to high range. When lever is pushed in", a built-in cam lock holds speed constant, even under heavy loads.

D. Quick Change Gear Box. Gear Box provides a choice of 54 feed rates and 54 thread pitches (including 27 threads per inch) by means of two selector levers with rugged, needle bearing equipped tumbler gears. Thread and feed chart makes it easy to set selector levers.

E. Modern Carriage has Convenient Controls. Micrometer collars are large in size for easy, direct reading while lock knobs prevent slippage. The large apron handwheel with its "loose" handwheel, the fast-action clutch lever, the unique feed selector lever, and the lever for half-nuts, all have been designed with the operator in mind. Lock-out feature of feed selector prevents the simultaneous setting for power feeding and threading.

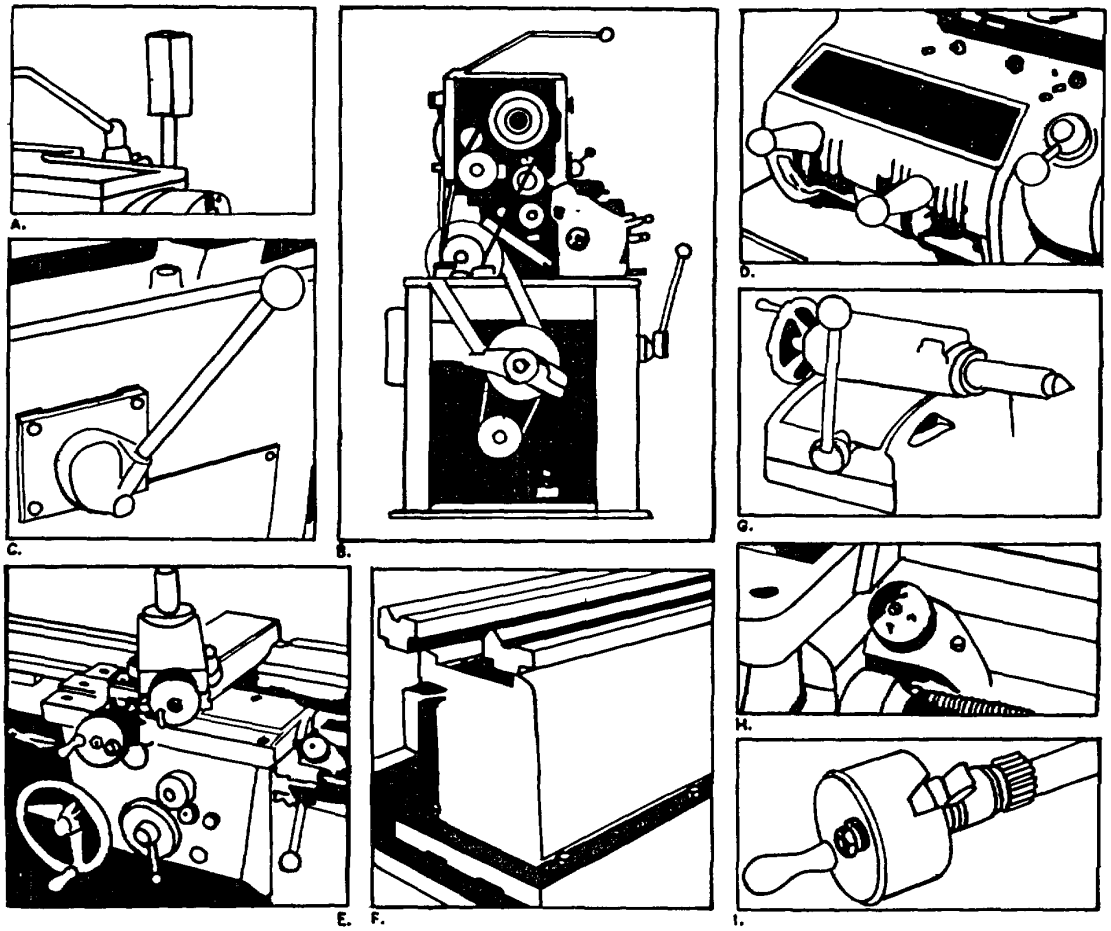
F. Extra Deep Ben is Equipped with Flame Hardened Ways. The extra strong "back-bone" on Metal Lathes is provided by a heavy, massive be that is both wide and deep. Bracing is stress engineered for continued accuracy. Precision ground V and flat ways are flame hardened to assure longer life and continued accuracy.

G. Rugged Tailstock. Husky, compact, easy to move and adjust. Ram is graduated in 1/16" and has a No. 3 M.T. (NO. 2 M.T. on 10" Model). On 14" and 11" lathes, ram has a tang slot for easy removal of tooling with a thang-type No. 3 M>T> shank. Tailstock has an off-set feature for taper turning and an ejection feature for centers.

H. Standard Equipment Thread Chasing Dial.

Dial speeds up the cutting of both external and internal threads because it is instantly available and always operating.

I. Exclusive Built-in Thread Stop. Only 14" and 11" Metal Lathes provide a built-in thread stop, Photo shows bottom side of stop for clarity. To operate, simply push in to engage: pull out to disengage. Makes thread cutting twice as easy and twice a fast. Provides a positive stop that cannot become lot or misplaced like the conventional "clamp-on" type.



11” METAL LATHE

CATALOG LASTING
CONVENIENT ONE NUMBER ORDERING

FOR SINGLE PHASE OPERATION
NO. 25-450 11” Metal Lathe Complete. Includes l-00 tapered key drive spindle nose; hardened bed 36’ between centers; 1 1/2 HP, 115/230 V, 1725 RPM, 60 hertz, single phase motor with 24 V push button reversing station, magnetic starter, transformer and overload protection, mounted and wired for 230 V, unless 115 V is specified; power cord and plug; and Standard Equipment as listed, 981q lbs.

FOR THREE PHASE OPERATION
†NO. 25-451 11” Metal Lathe Complete . Includes l-00 tapered key drive spindle nose; hardened bed, 36” between centers; 3HP 230/460 V, 1725 RPM, 60 hertz, three phase motor with 24 V push button reversing station, magnetic starter, transformer and 3-leg overload protection, mounted and wired for 230 V, unless 460 V is specified; and Standard Equipment as listed. 1014 lbs.

†No. 25-452 11” Metal Lathe Complete. Same as No. 25-451, except wired for 200 V, 1014 lbs.

†Where electrical controls must comply with ANSI B-11 Series Machine Tool Standards, NFPA 79 Standard or JIC Standards, the No. 49-001 Electrical Kit must be ordered in addition to the Catalog Number for the All-Inclusive Machine.

MACHINE DATA
Capacity
Swing over bed and saddle wings .....11 1/16” (280.99 mm)
Swing over cross slide.....6 7/16” (163.5 mm)
Between centers with l-00 tapered key drive nose..... 36” (814.4 mm)

THREADS AND FEEDS
Quick change gear box with 54 thread and feed changes R.H. or L.H. Threads.. 4 4 1/2, 5, 5 1/2 5 3/4, 6, 6 1/2 6 3/4, 7, 8, 9, 10, 11, 11 1/2, 12, 13, 13 1/2 14, 16, 18, 20, 22, 23, 24, 26, 27, 2, 32, 36, 40, 44, 46, 48, 52, 54, 56, 64, 72, 80, 88., 92, 96, 104, 108, 112, 128, 144, 160, 176, 184, 192, 208, 216, 224.
Range of feed rates per revolution:
Longitudinal..... 0902-0016:.....Cross 0301-0005
Lead Screw .....3/4 “ (19.05 mm) dia. Acme x 8 t.p.i.

SPINDLE AND HEADSTOCK
Infinite stepless speeds in direct drive ..... 220-1550 rpm
Infinite stepless speeds in back gear..... 45-250 rpm
Spindle dia. at roller bearings ..... 2 1/4: (57.15 mm)
Spindle Center .....takes No. 2 M.T.
Hole through spindle .....1 3/8” (34.925 mm)
Maximum collet capacity (5-C type collet).....1 1/16” (26.9875 mm)

BED (furnished with leveling screws)
Length.....61 1/4” (1555.8 mm)
Width.....8 1/4” (209.5 mm);.....Depth 5 7/8” (149.2 mm)
Width of V’s ..... 3/4 “ (19.05 mm)

CROSS SLIDE AND COMPOUND REST
Length of saddle V-way .....12 3/8”)314.3 mm)
Width of bridge .....4 1/4” (107.95 mm)
Cross slide travel .....6 3/” (171.45 mm)
Compound travel .....(2 1/4” 57.15 mm)
Travel of cross slide with taper attachment locked ...6 3/16” (157.2 mm)
Travel of carriage with taper attachment locked .....9 1/16” (230.2 mm)
Maximum cross travel of tool by taper attachment ..... 1 3/8” (34.9 mm)
Powered cross feed.....Wipers for saddle

TOOL POST
3/16” X 1 7/16”(14.29 mm X 36.5 mm) opening takes standard tool holders for 5/16” (7.94 mm) bits

TAILSTOCK
Ram.....dia. 1 3/8” (34.9 mm); travel 2 3/4” (69.85 mm); has No. 3 M.T. with tang slot
Length of graduations marked on spindle by 1/16ths ..... 3” (76.2 mm)
Center..... No. 3 M.T.
Set-over ..... 3/4” (19.05 mm)

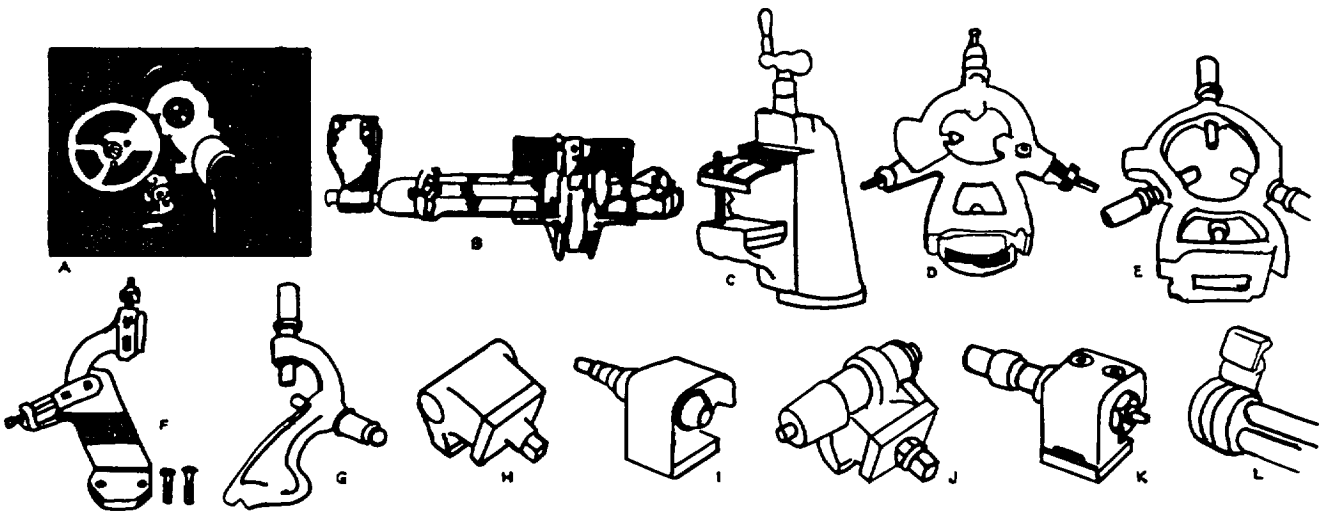
OVERALL DIMENSIONS
Cabinet and Machine .....69 3/4” (1771.7 mm) left to right x 25 1/2” (647.7 mm) front to rear x 49 1/2” (1257.3 mm) high
Coolant pan .....1 3/16 x 22 1/2 x 68” (30.2 x 571.5 x 1727.2 mm) outside dimensions
Drain hole at rear has 1/2 “ (12.7 mm) pipe tap

MOTORS
Accommodates NEMA frame motors.....143T-145T-185-182T

STANDARD EQUIPMENT

- Lathe with Hardened Bed Ways
- Motor with 24 V Controls
- Cabinet with Coolant Pan, Doors and Shelved
- Quick Change Gear Box
- Variable Speed Drive Complete with Belts
- Extra Shear Pins
- Thread Chasing Dial
- Thread Cutting Stop
- Motor Pulley for 3/4” Shaft
- Tool Post, Ring and Rocker
- 7” Diameter Drive Plate
- Two 60° Centers. No. 2 MT for Headstock-No. 3MT for Tailstock
- Combination Wrench for Tool Post, etc.
- Spindle Adapter, No. 2 MT I.D.
- Box Wrench for Tailstock
- Spanner Wrench for Draw Nut (included on tapered nose models only)
- Standard equipment coolant-chip pan has beveled design for easy chip removal and clean up.
- Cabinet contains built-in leveling jacks that guarantee proper alignment for precision work.
- Adjusting collar enables all play to be removed from spindle.
- Headstock has two zero precision, tapered roller bearings at spindle nose end . . . extra large, lubricated-for-life ball bearing at outboard end.
- Massive 2 1/4” diameter spindle eliminates chatter on heavy cuts.
- Unique drive selector can be shifted to loose spindle, locked spindle, back gear drive or direct drive simply by moving the selector lever.
- Apron has double wall construction to assure proper lubrication.
- Built-in thread stop makes thread cutting easy and fast.
- Precision cut lead screw has a hidden, easily accessible shear pin. . . T-section key way prevents wear on thread and damage to half-nuts.
- Tailstock ram has a tang slot for positive drive of twist drills.

FLAME HARDENED BE WAYS-STANDARD EQUIPMENT



METRIC TRANSPOSING GEAR KITS—With transposing gear, stud gears and everything needed to convert lathe for cutting standard metric thread pitches. Include instructions for field mounting.

A For 10" Metal Lathe. 24 lbs. . .. . No. 25-875
For 11" Metal Lathe. 28 lbs. .. .. No. 25-630
For 14" Metal Lathe. 72 lbs .. .. No. 25-245

TAPER ATTACHMENTS—Telescoping type. Used for boring and turning tapers at one setting with adjustment by means of a micrometer screw. Not necessary to disconnect cross feed screw to change from straight to taper turning. Includes instructions for field mounting.

B For 10" Metal Lathe. Maximum taper up to 8¼" at one setting, 3½" per foot, 16° included angle 40 lbs. .. ..No. 25-856
For 11" Metal Lathe. Maximum taper up to 9½" at one setting, 3½" per foot, 17° included angle 34 lbs .. .. No. 25-656
For 14" Metal Lathe. Maximum taper up to 9¾" at one setting, 3½" per foot, 18° included angle. Binding lever can be left loose while cutting tapers to permit rapid approach to work by means of cross slide handwheel, or binding lever can be tightened so that cross slide is directly traversed by means of the cross slide pull bar. 140 lbs. . .. . No. 25-222

MILLING ATTACHMENTS—Universal work-holding fixtures for milling, keyway cutting, boring, etc. Vise opens to 1¾" with 1½" x 3½" jaws, each provided with two V grooves for round stock. Vertical travel is 4½" by means of ball crank handle. Zero start micrometer collar is calibrated in .001.

C For 10" Metal Lathe. 25 lbs .... No. 25-822
For 11" Metal Lathe. Includes No. 25-520 No. 3 M T spindle adapter. 26 lbs .. .. No. 25-651

STEADY RESTS

D For 10" Metal Lathe. 3/16" to 3" capacity. 12 lbs .. .. No. 25-852
For 14" Metal Lathe. 3/16" to 4¾" capacity. 25 lbs. ..... No. 25-223
E For 11" Metal Lathe. 3/16" to 3½" capacity. Deluxe type with telescoping brass jaws. 20 lbs. .. ..No. 25-652

FOLLOWER RESTS

F For 10" Metal Lathe. 3/16" to 3" capacity. 10 lbs. ... .No. 25-850
For 14" Metal Lathe. 3/16" to 4¾" capacity. 14 lbs. ..... No. 25-224
G For 11" Metal Lathe. 3/16" to 2¾" capacity. Deluxe type with telescoping brass jaws. 14 lbs .....No. 25-650

LATHE CHUCKS—BACK THREADED OR INCLUDE FITTED CHUCK PLATE. WRENCH INCLUDED.

Size	No. of Jaws	For Spindle Nose	Lathe Size	Wt., Lbs.	Cat. No.
5"	3	1½"-8	10"	8	25-870*
6"	3	L-00	11", 14"	23	25-572*‡
9"	3	L-00	14"	63	25-217†‡
6"	6	L-00	11", 14"	25	25-580*‡
6"	4	1½"-8	10"	9	25-873
8"	4	L-00	11", 14"	26	25-576
10"	4	L-00	14"	63	25-232

*Includes internal and external jaws. †Has reversible top jaws. ‡Adjust-Tru.

DRILL CHUCK—3-jaw key type, 0-½" capacity, with No. 2 M T shank. Includes chuck key 2½ lbs ....No. 46-968

DRILL CHUCK—3-jaw key type, 0-½" capacity, with No. 3 M T shank. Includes chuck key 3 lbs ....No. 17-820

PLAIN CARRIAGE STOPS—Used on either side of carriage to provide a positive longitudinal feed stop for cutting shoulders, etc. Include parts for mounting on front V-way of bed.

H For 10" Metal Lathe. 2 lbs .....No. 25-853
For 11" Metal Lathe. 2 lbs. .. ..No. 25-653
I For 14" Metal Lathe. 5 lbs. .....No. 25-227

MICROMETER CARRIAGE STOPS—Used on either side of carriage to provide a positive longitudinal feed stop for cutting shoulders, etc. Micrometer collar is graduated in .001", provides accurate setting, is self locking by means of a unique spring lock feature. Include parts for mounting on front V-way of bed.

J For 10" Metal Lathe. 2½ lbs. ....No. 25-854
For 11" Metal Lathe. 3 lbs. .....No. 25-654
K For 14" Metal Lathe. 2 lbs. .....No. 25-228

FOUR-POSITION CARRIAGE STOPS—Used to provide up to four positive longitudinal feed stops for repetitive operations like spacing shoulders on shafts, etc. Stop fingers are knurled for easy setting and locked by set screws. Include parts for mounting to front V-way of bed.

L For 11" Metal Lathe. 4" range. 5 lbs. .....No. 25-655
M For 14" Metal Lathe. 4½" range. Includes stop finger for carriage, extension hub for back gear engagement shaft, mounting instructions. 11 lbs. ... . No. 25-240

THREAD STOP . . . Makes thread cutting faster, easier; limits the forward travel of cross slide against a positive, adjustable stop. Clamps on dovetail of saddle in front of cross slide.

For 10" Metal Lathe. 1½ lbs ... . No. 25-830

N **SAFETY TYPE LATHE DOGS**—Bent tail type. Made of forged, selected steel. Include socket screw and wrench

Capacity, In.	Lathe Size	Duty	Wt., Lbs.	Cat. No.
3/8	10", 11"	Lt.	½	25-861
½	10", 11"	Lt	½	25-862
¾	10", 11"	Lt.	½	25-863
1	10", 11"	Lt.	¾	25-864
1¼	10", 11"	Lt.	1	25-865
1½	10", 11"	Lt.	1	25-866
3/8	11", 14"	Hvy.	½	25-661
½	11", 14"	Hvy.	½	25-662
¾	11", 14"	Hvy.	¾	25-663
1	11", 14"	Hvy.	1	25-664
1¼	11", 14"	Hvy.	2	25-665
1½	11", 14"	Hvy.	2¼	25-666
1¾	14"	Hvy.	3½	25-262
2	14"	Hvy.	4	25-263

DRIVE PLATES

Dia. In.	For Spindle Nose	Slots	Lathe Size	Wt., Lbs.	Cat. No.
6	1½"-8	2	10"	4	25-840
7	L-00	1	11", 14"	7	25-642
9	L-00	2	11", 14"	13	25-225

FACE PLATES

9	1½"-8	8	10"	14	25-839
10	L-00	8	11", 14"	13	25-648
13½	L-00	8	14"	38	25-226

ROUGH CHUCK PLATES—Cast iron, with enough stock left to be fitted to chucks requiring chuck plate of diameter indicated. Without holes for mounting chuck.

For 11" and 14" Metal Lathes. 10" for L-00 tapered nose. 32 lbs. . . ... No. 25-246

O **STEEL COLLETS**—Self-releasing for round stock. Heat treated and hardened.

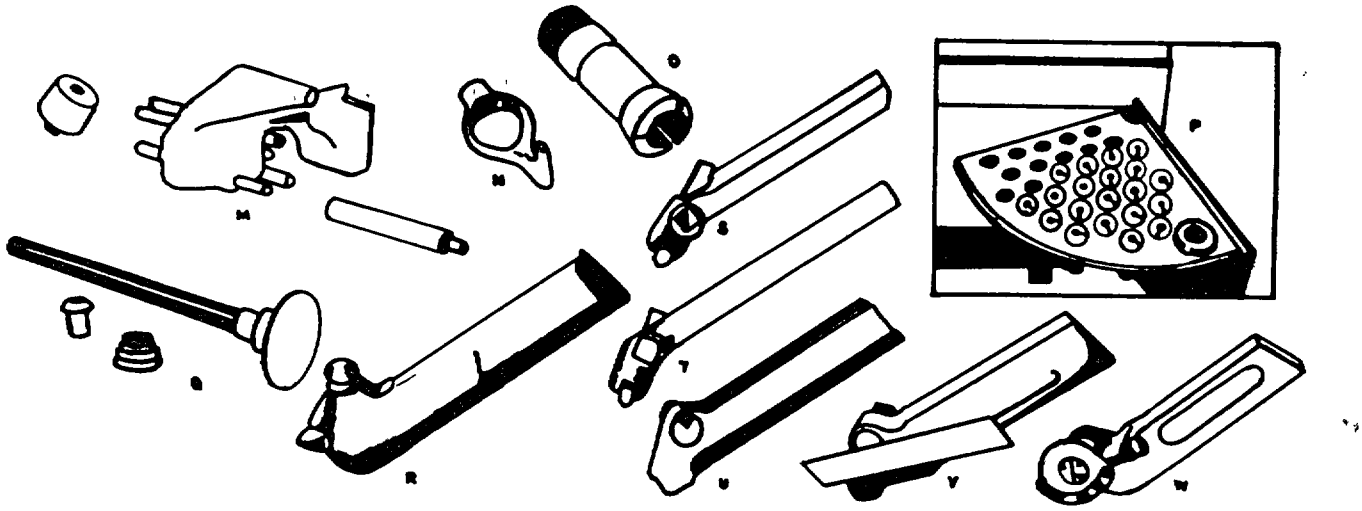
Quantity	Capacities	Lathe Sizes	Wt., Lbs.	Cat. No.
Set of 6 (4C)	1/16" to 3/8" by 16ths	10"	4	25-800
Set of 6 (4C)	7/16" to 3/4" by 16ths	10"	4	25-810
Set of 8 (5C)	1/16" to ½" by 16ths	11", 14"	5	25-606
Set of 8 (5C)	9/16" to 1" by 16ths	11", 14"	5	25-610

RACKS FOR STEEL COLLETS

For 10" Metal Lathe. Holds 19 collets, 2 centers, nose cap, spanner wrench and draw bar. 12 lbs. ..... No. 25-828
For 11" Metal Lathe. Holds 17 collets, wrench, collet sleeve and draw bar. Swivel or rigid mounting. 14 lbs .... No. 25-628
P For 14" Metal Lathe. Holds 32 collets, collet sleeve. 6 lbs. .....No. 25-235

Q **DRAW BARS FOR COLLETS**—Have hardened threads, ball thrust bearing and collet sleeve.

For 10" Metal Lathe. (Collet sleeve not required.) 6 lbs. .....No. 25-825
For 11" Metal Lathe.
With 2¼"-8 threaded nose. 9 lbs. .....No. 25-625
With L-00 tapered nose. 9 lbs. ..... No. 25-626
For 14" Metal Lathe. 9 lbs. .. ..No. 25-120



LEVER TYPE BALL BEARING COLLET CLOSERS—Used with all 5-C collets—round, square, hex, step, soft, internal, external, etc Takes bar stock up to 1 1/16" diameter. Includes mounting bracket with bolts, collet sleeve and spindle nose cap

For 11" Metal Lathe.
For 2 1/4"—8 threaded nose lathes Includes spanner wrench for spindle nose cap 16 lbs ..... **No. 25-553**
For L-00 tapered nose lathes 15 lbs ..... **No. 25-554**

For 14" Metal Lathe.
For 14" Lathes with Serial No 163-1631 and higher. 19 lbs ..... **No. 25-119**

CENTERS—HIGH QUALITY TYPE

Type	Recommended Use and Description	Shank	Lathe Size	Wt., Lbs	Cat. No
60°	For headstock Soft, ground.	No 2 M T	10", 11"	½	25-542
60°	For headstock Soft, ground	No 3 M T	14"	1	25-238
60°	For tailstock Hardened and ground	No 2 M T	10"	½	25-541
60°	For tailstock Hardened and ground	No 3 M T.	11", 14"	1	25-541
60° Half	For tailstock Hardened and ground	No 2 M T.	10"	½	25-843
60° Half	For tailstock Hardened and ground	No 3 M T	11", 14"	1	25-543
60° Live	For tailstock Guaranteed to .0002 T I R Compact roller bearing design with minmium overhang gives extreme precision and rigidity Front and rear bearing tracks are ground on spindle and body Ground replaceable point Center adjusts automatically for thrust and load	No 2 M T	10"	1½	25-844
60° Live	For tailstock Has same features as 25-844	No 3 M T	11", 14"	3	25-544
60° Live Hollow	For tailstock Cup is heat treated, hardened and ground Head is carried on an angular contact pre-loaded ball bearing	No. 2 M T	10"	1½	25-845
60° Live Hollow	For tailstock Cup is heat treated, hardened and ground Head is carried on an angular contact pre-loaded ball bearing	No 3 M T.	11", 14"	3	25-545

TOOL HOLDERS—Drop forged from special steel, heat treated and hardened, with set screw and wrench

For 10" Metal Lathe.

Type	Shank Size	Bit or Blade Size	Bit or Blade Furnished	Wt., Lbs	Cat. No.
Straight	3/8 x 7/8"	1/4" x 1/4"	HSS Bit	¾	25-680
Right-Hand Off-Set	3/8 x 7/8"	1/4" x 1/4"	HSS Bit	¾	25-681
Left-Hand Off-Set	3/8 x 7/8"	1/4" x 1/4"	HSS Bit	¾	25-682
Straight Carbide	3/8 x 1 5/16"	1/4" x 1/4"	None	⅞	25-689
Right-Hand Off-Set Carbide	3/8 x 1 5/16"	1/4" x 1/4"	None	⅞	25-690
Left-Hand Off-Set Carbide	3/8 x 1 5/16"	1/4" x 1/4"	None	⅞	25-691
Straight Cutting Off and Side	3/8 x 3 1/2"	3/32 x 5/8"	HSS Blade (ground end)	¾	25-683
Right-Hand Off-Set Cutting Off and Side	3/8 x 3 1/2"	3/32 x 5/8"	HSS Blade (ground end)	⅝	25-684
Left-Hand Off-Set Cutting Off and Side	3/8 x 3 1/2"	3/32 x 5/8"	HSS Blade (ground end)	⅞	25-685

For 11" Metal Lathe.

	Type	Shank Size	Bit or Blade Size	Bit or Blade Furnished	Wt., Lbs.	Cat No
R	Straight	½ x 1⅛"	5/16" x 5/16"	HSS Bit	2	25-671
S	Right-Hand Off-Set	½ x 1⅛"	5/16" x 5/16"	HSS Bit	2	25-672
	Left-Hand Off-Set	½ x 1⅛"	5/16" x 5/16"	HSS Bit	2	25-673
	Straight Carbide	½ x 1¼"	5/16" x 5/16"	None	2	25-677
T	Right-Hand Off-Set Carbide	½ x 1¼"	5/16" x 5/16"	None	2	25-678
	Left-Hand Off-Set Carbide	½ x 1¼"	5/16" x 5/16"	None	2	25-679
U	Straight Cutting Off and Side	½ x 1 3/16"	⅛" x ¾"	HSS Blade (ground end)	2	25-674
V	Right-Hand Off-Set Cutting Off and Side	½ x 1 3/16"	⅛" x ¾"	HSS Blade (ground end)	2	25-675
	Left-Hand Off-Set Cutting Off and Side	½ x 1 3/16"	⅛" x ¾"	HSS Blade (ground end)	2	25-676

SPECIAL TOOL POST RING FOR 11" METAL LATHE—Adapts lathe for use with ⅜" (size 0) tool holders, threading tool, knurling tools and boring tool Raises 10" Lathe Toolholders to proper height for use on 11" Lathe ¾ lb . ... ..**No. 25-629**

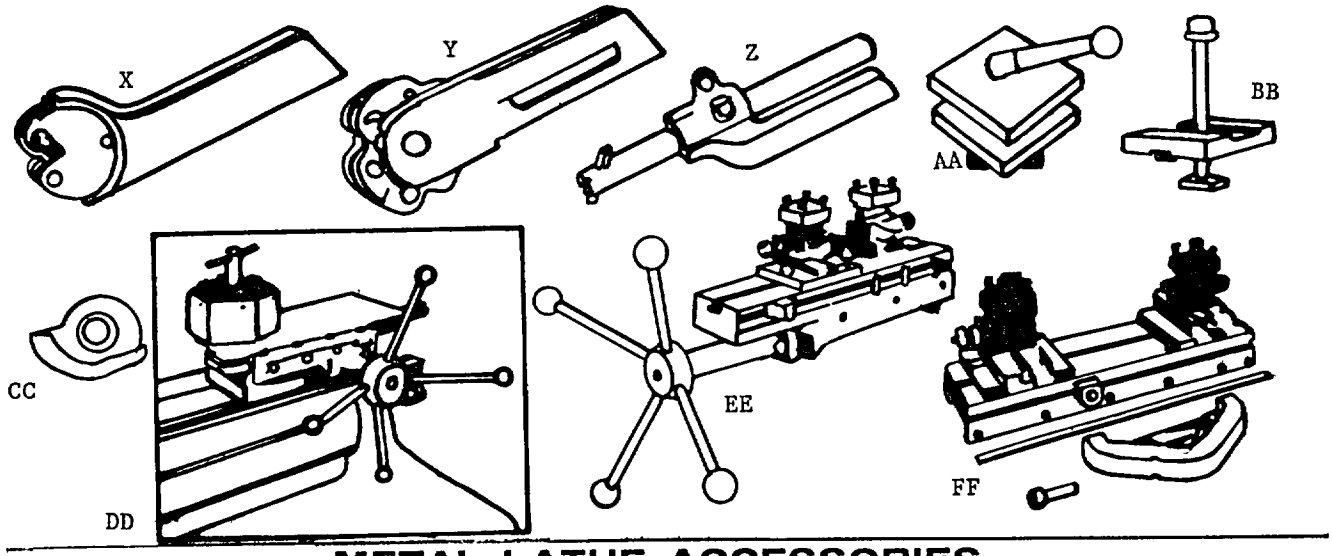
For 14" Metal Lathe.

	Type	Shank Size	Bit or Blade Size	Bit or Blade Furnished	Wt, Lbs	Cat. No.
R	Straight	⅝ x 1⅜"	⅜ x ⅜"	HSS Bit	3	25-247
S	Right-Hand Off-Set	⅝ x 1⅜"	⅜ x ⅜"	HSS Bit	3	25-248
	Left-Hand Off-Set	⅝ x 1⅜"	⅜ x ⅜"	HSS Bit	3	25-249
	Straight Carbide	⅝ x 1½"	⅜ x ⅜"	None	3	25-250
T	Right-Hand Off-Set Carbide	⅝ x 1½"	⅜ x ⅜"	None	3	25-251
	Left-Hand Off-Set Carbide	⅝ x 1½"	⅜ x ⅜"	None	3	25-252
U	Straight Cutting Off and Side	⅝ x 1⅜"	⅛ x ⅞"	HSS Blade (ground end)	3	25-253
V	Right-Hand Off-Set Cutting Off and Side	⅝ x 1⅜"	⅛ x ⅞"	HSS Blade (ground end)	3	25-254
	Left-Hand Off-Set Cutting Off and Side	⅝ x 1⅜"	⅛ x ⅞"	HSS Blade (ground end)	3	25-255

SPECIAL TOOL POST RING FOR 14" METAL LATHE—Adapts lathe for use with ½" (size 1) toolholders, threading tool, knurling tools and boring tool Raises 11" Lathe Toolholders to proper height for use on 14" Lathe 1 lb ..**No 25-278**

W THREADING TOOLS—The tool holders are drop forged from special steel, heat treated and hardened The HSS cutter is ground to an included angle of 60°, and backed off for proper clearance Cutter is sharpened by grinding top edge only, therefore, true form and correct angle are maintained

Size of Tool Holder	Lathe Size	Wt , Lbs	Cat No
⅜ x ⅞"	10"	¾	25-686
½ x 1⅛"	11"	2	25-687
⅝ x 1⅜"	14"	2½	25-256



METAL LATHE ACCESSORIES

DIAMOND KNURLING TOOLS—Knurls and pins are carefully made from high grade tool steel, hardened and tempered. Teeth of knurls are accurately cut concentric to hole to assure quality knurling of work piece. Self-centering head type has one pair of medium knurls Revolving head type has three pairs of fine, medium and coarse knurls Holders are hardened.

Size of Tool Holder	Type of Head	Face of Knurl	Dia. of Knurl	Lathe Size	Wt., Lbs.	Cat. No.
X ⅜ x ⅞"	SC	3/16"	⅝"	10"	¾	25-687
Y ⅜ x ⅞"	RH	3/16"	⅝"	10"	1	25-688
X ½ x 1⅛"	SC	¼"	¾"	11"	2	25-688
Y ½ x 1⅛"	RH	¼"	¾"	11"	2	25-689
X ⅝ x 1⅜"	SC	¼"	¾"	14"	3	25-258
Y ⅝ x 1⅜"	RH	¼"	¾"	14"	3	25-259

SC—Self-centering head. RH—Revolving head.

Z BORING TOOLS—Unique design of holder takes bars of various diameters without sleeves or bushings. The sleeve-bar clamping feature is exceptionally strong and provides for rapid adjustment of either straight or angular cutters without the need for extra parts. Includes two wrenches.

Size of Tool Holder	Cutters Included	Bar Size Range	Lathe Size	Wt., Lbs.	Cat. No.
⅜ x ⅞"	45°, 90°	¼ to *⅝"	10"	2⅜	25-692
½ x 1⅛"	45°, 90°	¼ to *¾"	11"	5	25-693
⅝ x 1⅜"	45°, 90°	⅜ to *1 3/16	14"	8	25-260

*Indicates size of bar furnished.

AA TURRET TOOL POSTS FOR COMPOUND—For facing, turning, thread cutting, drilling, boring, etc. Hold 4 cutter bits, 12 position indexing feature, 30° position for threading.

For 10" Metal Lathe, 2½" sq. head takes bits to ⅜". 10 lbs. .....No. 25-851

*For 11" Metal Lathe, 3½" sq head takes bits to ½". 9 lbs .....No. 25-551

For 14" Metal Lathe, 3½" sq. head takes bits to ⅞". 9 lbs. . .....No. 25-236

*When used on Double Tool Post Cross Slides No. 25-556 and 25-568, No. 25-552 Adapter required. Order separately.

BB ADAPTER—For mounting No. 25-551 Turret Tool Post on No. 25-556 or No. 25-568 Double Tool Post Cross Slide Mounts on either front or rear post of cross slide. Complete with base, alignment keys, stud with clamp plate, nut and washer. 2 lbs .....No. 25-552

REPLACEMENT CUTTING-OFF BLADES

For 10" Metal Lathe, 1/32" x ⅜", made of HSS, ground and ready for use in tool holders Nos 25 683 and 25-684. 2 lbs. ....No. 25-695

For 11" Metal Lathe, ⅛" x ¾", made of HSS, ground and ready for use in tool holders Nos. 25-674, 25-675 and 25-676 2 lbs. .. ..No. 25-694

For 14" Metal Lathe, ⅛" x ⅞", made of HSS, ground and ready for use in tool holders Nos. 25-253, 25-254 and 25-255. 2 lbs. ... No. 25-261

CC FORMED THREADING CUTTER

For 10" Metal Lathe, Sharp 60° V-thread, fits No. 25-686 Threading Tool. 2 lbs. No. 25-696

BELT AND PULLEY GUARD

For 10" Metal Lathe, Aluminum, with ⅜" Slots. Recommended when motor is mounted at rear on wooden bench. 7 lbs. .....No. 25-859

DELUXE LAMP ATTACHMENT

For 10", 11" and 14" Metal Lathes. For 115V. Includes 18" flexible gooseneck, reflector and 6-foot cord with 3-prong grounding type plug. Uses standard bulb (not included) up to 75 watts 3 lbs. .... No. 25-857

SPINDLE NOSE SPLASH GUARDS—Cannot be used with three or four-jaw chucks.

For L-00 tapered nose 11" Metal Lathe 2 lbs ..... No. 25-559

For L-00 tapered nose 14" Metal Lathes. 3 lbs. ..... No. 25-241

COOLANT GROUPS.

For 11" Metal Lathes. Mounts on either No. 25-568 Double Tool Post Cross Slide or on saddle of carriage. 8 lbs. .....No. 25-558

For 14" Metal Lathes. Mounts on saddle of carriage. 5 lbs. .....No. 25-244

DD ENCO SELF-INDEXING BED TURRETS—Convert Metal Lathes to Hand Turret Lathes at low cost. 10", 11" and 14"

MACHINE DATA

	No. 25-564* Bed Turret	No. 25-567* Bed Turret	No. 25-566* Bed Turret
Size of Lathe	10"	11"	14"
Shipping Weight	113 lbs.	120 lbs.	166 lbs.
Tool Hole Range	⅝" to 1"	⅝" to 1"	1" to 1½"
Turret Head Across Flats	5⅛"	5⅛"	7"
Turret Face Dimensions			
Wide	3"	3"	3⅞"
High	2⅞"	2⅞"	3⅜"
Maximum Diameter Tool Clearance Over Ram	3⅛"	3¼"	5"
Total Ram Travel	7½"	7½"	7½"
Ram Travel, Max. (self indexing)	6½"	6½"	6½"
Ram Travel, Min. (self indexing)	2"	2"	2"
Length of Ram	16½"	16½"	16½"
Base Length	11½"	11½"	11½"

PRODUCTION TYPE ACCESSORIES FOR 11" METAL LATHE. You can convert your standard Rockwell 11" Lathe for screw machine or turret lathe work by installing the following accessories and other items as required.

DOUBLE TOOL POST CROSS SLIDES. These deluxe, heavy-duty Double Tool Post Cross Slides are especially recommended for use with the Bed Turret. They are ideal for repetitive, high production manufacturing of a wide variety of parts.

T-slots in tool post pads and in slide provide transverse and longitudinal adjustment for accurate positioning of tool bits The hardened steel tool posts have left and right tool positions, sliding wedge height adjustment, and set screws to permit slight rotation of tool bits in a horizontal plane so that either angular or straight tool settings can be perfectly maintained.

MACHINE DATA

	No. 25-568	No 25-556
Slide:		
Travel	8"	5⅛"
Length	16"	15¼"
Width	4¼"	4¼"
Maximum Swing Over Slide	5⅛"	5⅛"
Tool Posts:		
Size of Bit	⅝" sq.	⅝" sq.
Tool Bit Slot:		
Depth	½"	½"
Height	1 3/16"	1 3/16"
Tool Height Adjustment	¼"	¼"
Distance Between Tool Posts:		
Maximum	10"	8¾"
Minimum	2"	2"
Adjustment of Tool Posts:		
Longitudinal	2½"	2½"
Transverse	9"	6¾"

EE BED MOUNTED DOUBLE TOOL POST CROSS SLIDE WITH PILOT WHEEL FEED. The extra long (8") travel of this slide permits the tool posts to be positioned far apart so that even large tooling in the bed turret can be fed in between the tool posts of the cross slide Has the speed and convenience of a lever type slide but is much safer because the operator's hands never need approach the work while feeding the tool bits. Slide traverses 4" for each revolution of the pilot wheel. No. 25-568

FF SADDLE MOUNTED DOUBLE TOOL POST CROSS SLIDE. This slide replaces the compound slide rest and regular cross slide of the 11" Metal Lathe. It mounts on the saddle dovetail of the regular lathe carriage and utilizes the cross feed lead screw regularly supplied with the lathe. It may be operated by power through the friction clutch in the apron or manually with the regular handwheel.

The taper attachment may be left on the lathe, if desired, when this cross slide is mounted. Includes complete instructions for easy field mounting by the user. 40 lbs. .....No. 25-556

GUARD FOR OUTBOARD GEAR TRAIN. Two-Piece Guard for Outboard Gear Train. Recommended when Lever Type Collet Closer is used on 11" Lathes with lead screw. Lower portion swings open to give access to gears, without disturbing collet closer. Complete with hinge, mounting bracket for upper portion, and lathe lubrication chart. 6 lbs. .....No. 25-561

INSTALLATION

SELECTING FLOOR SPACE

Vibration transmitted through inadquately constructed floors by adjacent machinery or other sources can impair the accuracy of your lathe. Therefore, it is of utmost importance that the lathe be mounted to a solid, level foundation, preferably concrete.

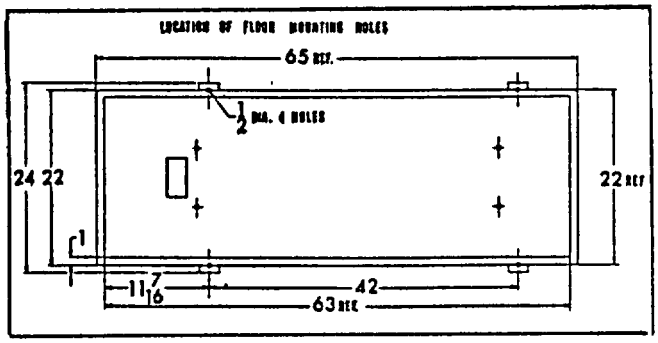


Fig. 2.

Unless substantially constructed, a wood floor should be braced against sagging and transmission of vibration. Refer to Fig. 2 for floor plan dimensions for 11" Metal Cutting Lathe.

CLEANING THE LATHE

The bed ways and all other machined and unpainted surfaces of the lathe 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.) After cleaning, cover all unpainted surfaces with a light film of good machine oil.

INSTALLING THE MOTOR

If your lathe was purchased complete with a motor you may disregard these instructions because the motor has been mounted and the motor pulley adjusted to give correct alignment of the lower variable speed belt.

For easier wiring, the motor junction box should be toward the front of the lathe.

1. Place the pulley on motor shaft with key in place. Do not tighten set screw at this time, as the motor pulley will be adjusted to give correct alignment of the lower variable speed belt.

2. Remove nut, washer, and rubber bumper from the motor mounting plate.

3. Place motor on motor plate, install motor mounting bolts, and tighten nuts finger tight. A block of wood placed under the hinged motor plate will facilitate insertion of the four bolts for mounting the motor.

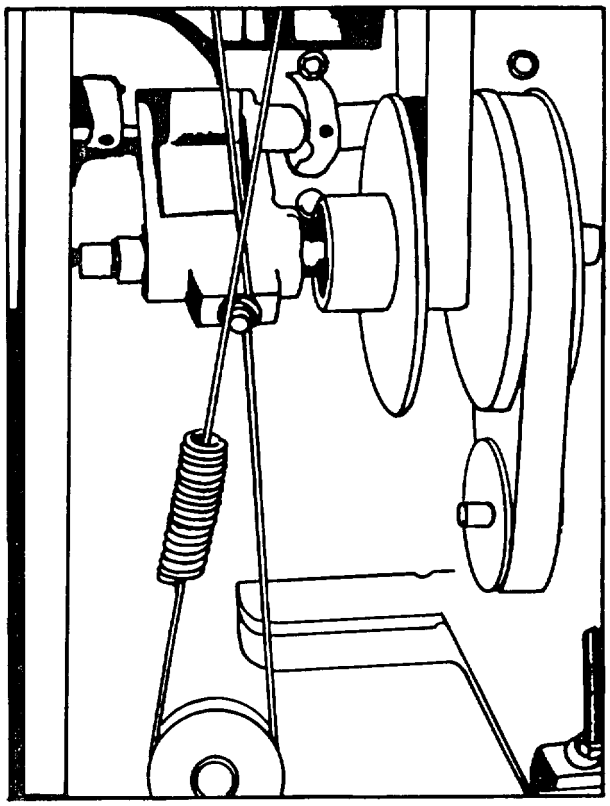


Fig. 3.

4. Turn the variable speed control lever counterclockwise until the variable speed pulley (\) Fig. 3, is completely lowered.

5. Adjust motor shaft to be parallel with variable speed pulley shaft.

6. Tighten motor mounting nuts.

7. Fig. 3-A shows the correct position of the speed control regulating pulley and cable when the variable speed control lever is in the straight up position.

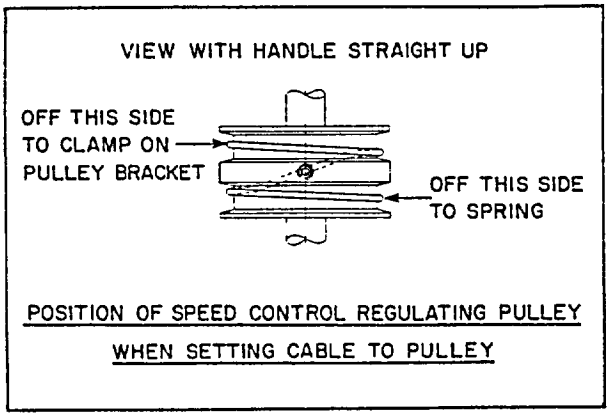


Fig. 3 -A

INSTALLING VARIABLE SPEED BELTS

1. Turn the variable speed control lever clockwise and raise the variable speed pulley to maximum height.

2. Remove the two spindle V-belts (A) Fig. 4, from the jackshaft pulley (B). Place the upper variable speed belt (C) on jackshaft pulley (B) and variable speed pulley (D), as shown in Fig. 4. Then reassemble the two spindle V-belts to the jackshaft pulley as shown.

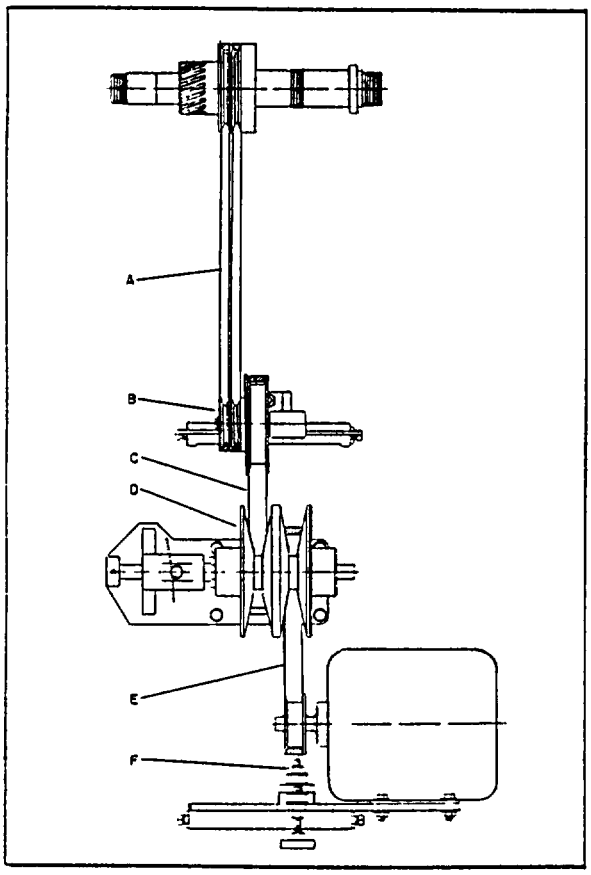


Fig. 4.

3. Place lower variable speed belt (E) Fig. 4, on the variable speed pulley (D). Remove nut, washer, and rubber bumper (F) from the motor mounting plate to allow belt to be placed on motor pulley. Lower variable speed pulley to assist in this operation. Replace nut, washer, and rubber bumper (F) Fig. 4.

4. With a straight edge held on either outside edge of the variable speed pulley and extending down past the motor pulley, adjust the motor pulley (by sliding the pulley in or out on the motor shaft) until the lower variable speed belt is parallel with the straight edge.

5. Then tighten the set screw in the motor pulley.

LEVELING THE LATHE

1. Place the cabinet on a level floor. If rocking occurs place metal shims between the bolt pads of the cabinet and floor.

2. Place a precision spirit level (A) Fig. 5, squarely across the V-ways at the headstock end of the bed.

3. Adjust shims under the headstock end of the cabinet until the bubble in the level is approximately centered. Carefully note the exact position of the bubble in relation to the graduations on the level.

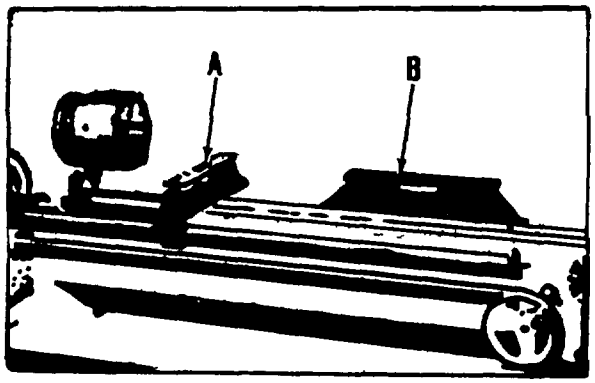


Fig. 5.

4. Without turning the level end for end, move it to the tailstock end of the bed, and place it squarely across the V-ways.

5. Adjust shims under the tailstock end of the cabinet until the bubble comes to rest at the same position as when the level %was at the headstock end of the bed.

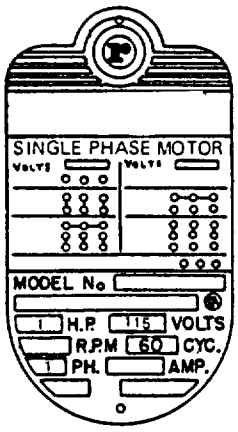
6. Place the level (B) Fig. 5, lengthwise on the center of the bed and shim until bubble is approximately centered.

7. Repeat Steps 3, 4, 5, and 6 until readings are approximately the same.

8. Fasten the cabinet to the floor.

ELECTRICAL RECOMMENDATIONS

A constant speed high starting torque, 1 hp, 1725 rpm motor is recommended. The motor pulley supplied with the lathe is designed to fit a motor shaft 3/4" in diameter. However, these motor pulleys are also available with 5/8", 7/8", 1" and 1 1/8" bore.



Nameplate on motor.

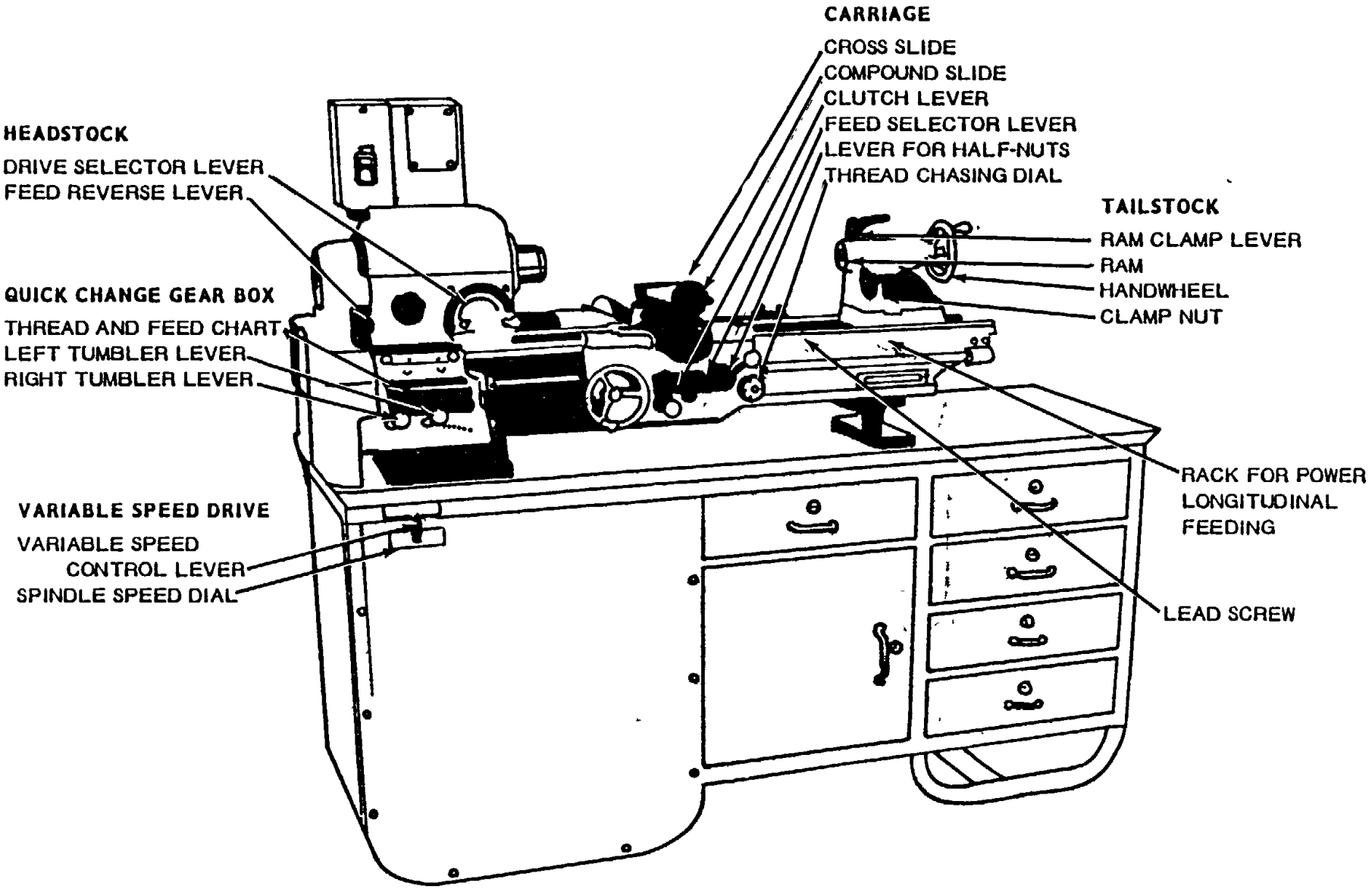
Make sure electrical characteristics are the same.

To connect to power source use heavy enough wire.

SINGLE PHASE
115 VOLT
60 CYCLE
POWER
SOURCE

Your power source.

H.P.	1 Phase
1	#12



ENGINE LATHE MOUNTED ON METAL BASE CABINET

OPERATION AND CONTROLS

The following is an explanation of the operating controls of the 11" Metal Lathe. An experienced lathe operator knows that there is always some difference between the location and type of control between different lathe models, even though the purpose of the controls is similar between one lathe and another. The novice should study these explanations carefully before turning on the power, to avoid damage to the lathe or injury to himself.

All operators will profit by a knowledge of how the controls operate and how they are to be set for standard lathe operations like turning, boring, facing, and thread cutting, or special lathe operations like milling, drilling, reaming, knurling, and others.

CAUTION:

Before turning on the motor for the first time, be sure that the Feed Reverse Lever of the Outboard Gear Train is set in the neutral position. Do not turn the Control Lever for the Variable Speed Drive until the motor is running. Then immediately rotate this control lever in a counter-clockwise direction to cause the lathe to run in a slow range before other controls are manipulated. Until you are familiar with the controls, it is better to manipulate them with the lathe running slowly.

HEADSTOCK CONTROLS

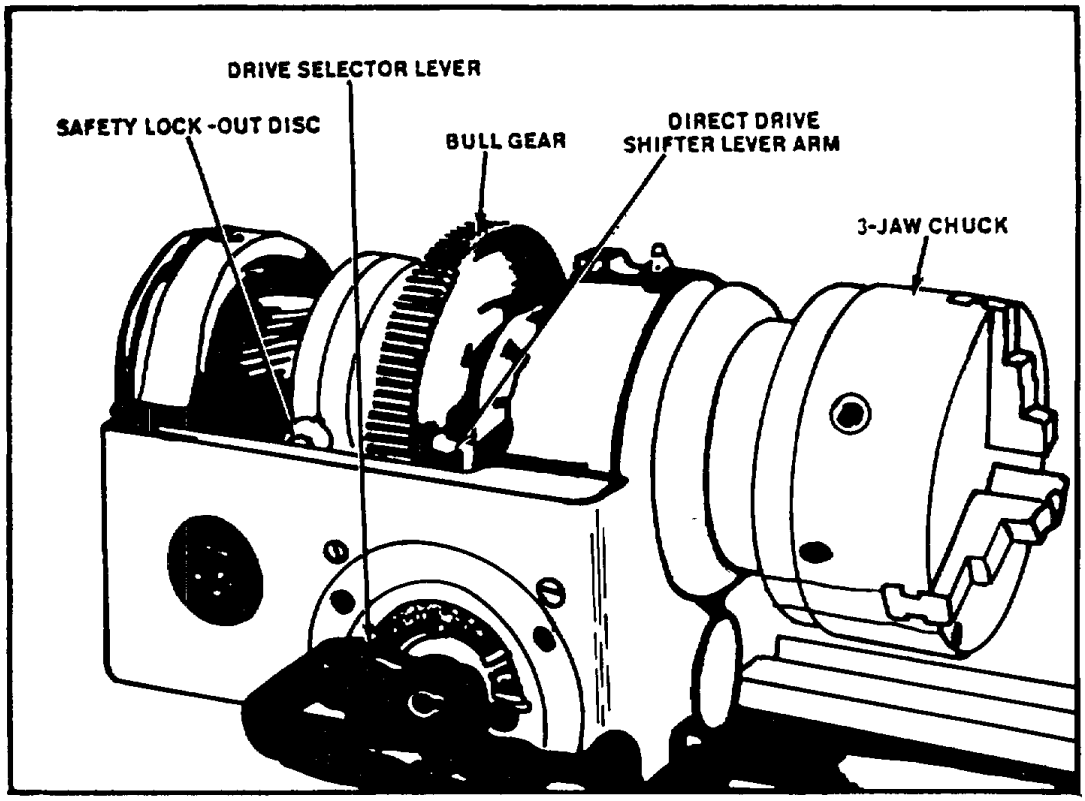


Fig. 7.

Drive Selector Lever Direct drive, loose spindle, locked spindle, and back gear drive are obtained by simply shifting the single drive selector lever to the desired position. SHIFTING FROM ONE POSITION TO ANOTHER MUST BE DONE ONLY WHEN THE MOTOR IS OFF AND THE SPINDLE IS AT REST. THE MOTOR SHOULD NEVER BE STARTED WITH THE LEVER IN LOCKED SPINDLE. Always check the position of the lever before starting the motor.

Direct Drive - In direct drive the shifter lever arm rides in the groove ring of the bull gear and pushes the bull gear to the left engaging the dog clutch halves.

Loose Spindle In loose spindle neither the dog clutch nor the back gears is engaged. The spindle is free to be rotated by hand. This facilitates the location of work in chucks, inspection of work, or the physical checking of work with indicators or micrometers.

Locked Spindle - When both the dog clutch and back gears are engaged the spindle is in locked position. In this position, the spindle cannot be rotated.

Back Gear Drive In back gear the dog clutch halves are disengaged. The back gears drive the spindle at the lower spindle speeds because of the 6 to 1 reduction ratio of the gears.

Safety Lock-Out Disc In addition to the convenience of the single drive selector lever for selecting any drive position, your lathe has a positive foolproof safety lock-out feature which makes damage to the drive impossible, even if a change in drive conditions is attempted with the motor running.

When the drive selector lever is engaged for back gear drive, loose spindle or direct drive, it is normally impossible for the operator to pull out of this drive position with the motor running. By a sudden jerk, the lever can sometimes be withdrawn from the locating hole while the motor is running, but no harm can be done, since this action automatically disengages the direct drive dog clutch in the headstock.

The spindle, of course, cannot rotate with the drive selector lever in the locked spindle position and the motor should not be turned on while in this position.

The drive selector lever can be disengaged from any position preliminary to selecting another position. If, however, the motor is turned on at this point, after pulling out from one position but before selecting the next position, the safety lockout feature prevents the inexperienced operator from going into direct drive or locked spindle position by preventing the lever from entering the selected hole.

To restore the drive selector lever to normal operating condition after reaching the condition described in the above paragraph, the operator should first bring the spindle to a stop by shutting the motor off, and then drop into the back gear or the loose spindle position. The operator can then select whichever drive condition he desires in the normal way with the motor off and spindle stationary.

OUTBOARD GEAR TRAIN

Feed Reverse Lever This Lever has three positions and shifts gears in the Outboard Gear Train which transmits power from the spindle of the lathe to the Quick Change Gear Box. When the lever is in the up position the lead screw rotates in a direction opposite to that of the spindle and when the lever is in the down position the lead screw and spindle rotate in the same direction. When the lever is in the center (neutral) position the Quick Change Gear Box is disconnected and the lead screw does not rotate.

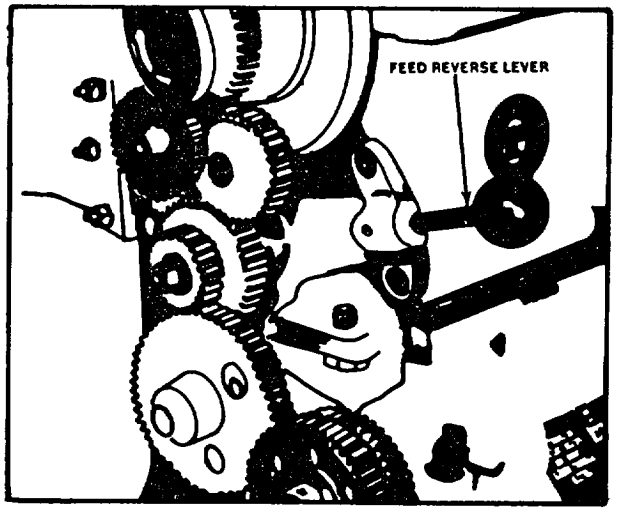


Fig. 8.

VARIABLE SPEED DRIVE

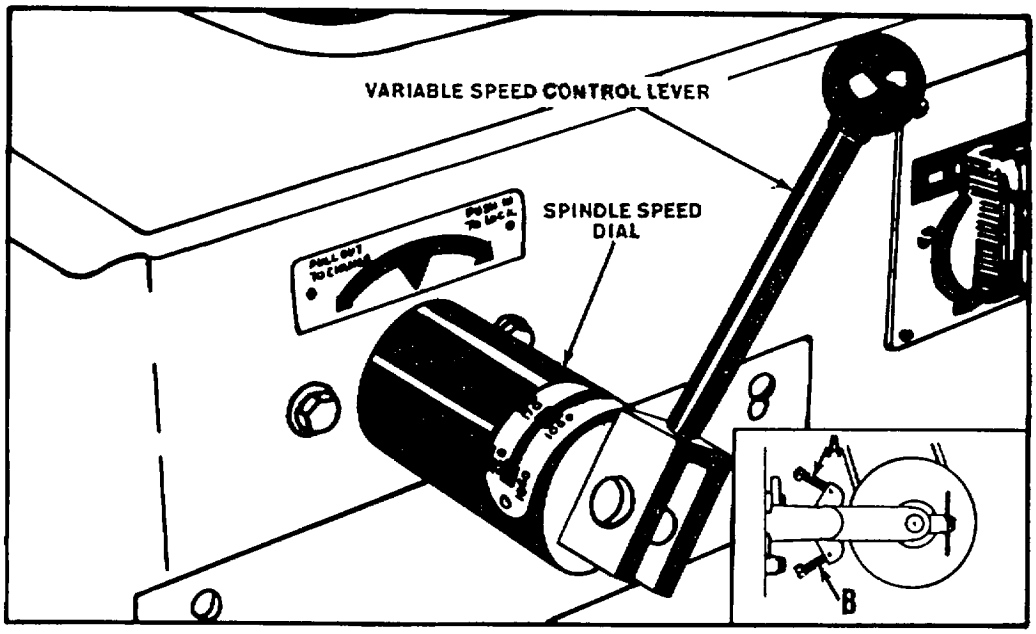


Fig. 9.

The variable speed control lever should not be moved except when the motor is running to avoid putting unnecessary strain on the variable speed drive pulley assembly. The control lever is turned clockwise to make the lathe run faster and counterclockwise to slow it down.

The infinite number of speed ranges between 45 and 1550 spindle rpm obtainable by the use of the variable speed drive makes it one of the most versatile means of power transmission available. The lower portion of the speed range is accomplished by the 6:1 reduction through the back gears.

The spindle speeds in back gear are 45 to 250 rpm. The spindle speeds in direct drive are 220 to 1550 rpm.

Two square head screws (A and B) are provided on the variable speed pulley bracket. (See drawing in Fig. 9). These screws are set to allow the lathe to be operated through its full range.

For inexperienced student operators, for repetitive two diameter work, or for other reasons, It is sometimes desirable to adjust the lathe to other than maximum or minimum spindle speeds.

This is done by adjusting the two square head screws.

Adjust screw (A) for high spindle speed and screw (B) for low spindle speed.

CARRIAGE

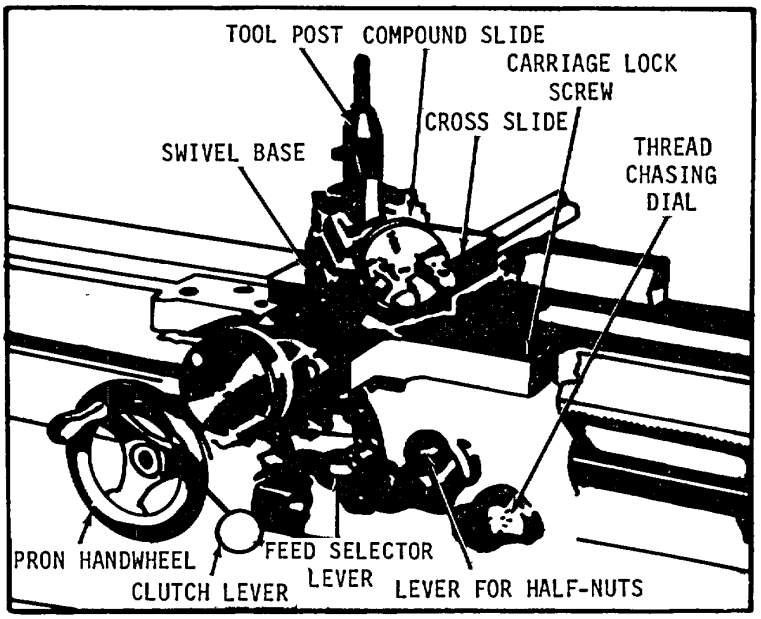


Fig. 10.

The lathe carriage includes the apron, saddle, cross slide, compound slide and tool post. The importance of the carriage cannot be overemphasized for it is the unit which supports and controls the motion of the tool.

The micrometer collars for the compound slide and cross slide are both of the "direct reading" type. For example if you advance the cross slide one mark on the collar, the diameter of the work piece will be reduced .002", although the tool will move in only .001". In other words, you "read" the diameter of the work piece "directly" from the collar.

One long and two short witness marks are found next to the micrometer collar for the compound slide, and the collar has a mark for each .001" movement. The two short witness marks form a vernier so that a movement of .0005" can be measured. When the compound slide is set at 90 degrees to the spindle, moving in one mark advances the tool .001", but takes .002" off the diameter. At all angle settings of the compound other than 90 degrees, the tool still moves .001" per mark, but the amount the diameter of the work is reduced is less than that "directly read" and it will be the product of the sine of the angle at which the compound is set.

The carriage lock screw must always be loosened before trying to feed the carriage along the bed. When firmly tightened, this screw will guard against possible movement of the carriage when facing, cutting off, and doing other operations where the cutting tool is moved only by feeding the cross slide or compound slide.

The apron handwheel is turned clockwise to move the carriage toward the tailstock, and counterclockwise to move it toward the headstock. Before using this handwheel, be sure that the carriage lock screw is loose, the half-nuts are disengaged from the lead screw, and that the clutch for power feeding is disengaged.

The feed selector lever has three operating positions. The clutch lever and the lever for half-nuts must be set in the disengaged positions, and then the feed selector lever is shifted by pulling out on the handle ball to retract the plunger from any one of the three holes in the apron. A spring causes the plunger to enter the selected hole when the handle ball is released.
The upper hole is for longitudinal power feeding, the center hole for threading, and the lower hole for power cross feeding.

With the teed selector lever in the center hole and the half-nuts engaged for threading the lever is locked, and cannot be shifted for power longitudinal or cross feeding until the half-nuts are disengaged.

The Thread Chasing dial speeds up the operation of cutting external or internal threads. The Carriage can be traveled back along the Bed rapidly by means of the Apron Handwheel with the halfnuts disengaged, instead of slowly by means of reversing the Lead Screw with the half-outs engaged. The function of the Thread Chasing Dial is to tell you just when to drop the half-nuts onto the Lead Screw so that the tool will repeatedly follow the same groove as the thread is being formed.

The Thread Chasing Dial rotates whenever the Lead Screw is rotating (except with the half-nuts engaged) and is divided by the four numerals (1, 2, 3, and 4) one each quarter circle on the dial. Watching these numerals pass the single witness mark, tells you when to "drop" the half-nuts onto the Lead Screw according to the following system.

Pitch or Threads per Inch	Example	Position for Subsequent Passes
1/4 Pitch	5-3/4 Threads per inch	Same position only
1/2 Pitch	4-1/2, 5-1/2, 6-1/2, 11-1/2	Opposite positions only - 2 Positions
Odd Pitch	5, 7, 9, 11,13, 23	Any of 4 Positions
Even Pitch	4, 6, 8, 10,12, 14, 16, etc. through 224	Any of 4 Positions
Pitches in Multiples of 8	8, 16, 24, 32, 40, 48. 56, 64, 72, 80, 88, 96 etc.	Drop in any position, Thread cutting dial need not be used.

The thread dial is used and referred to when cutting threads. When 1/4 threads are being cut, (for example 5 3/4 threads) drop the half-nuts in on any one of the four numbers of the thread cutting dial.

However, you must drop the half-nuts on the lead screw, for subsequent passes across the stock, on the same number you started with. If you start with the NO. 1 position on the dial, you must keep dropping the half-nuts when the thread cutting dial indicates the NO. I position. If you start with NO. 2, you must use NO. 2 position etc. As stated above, any one of the four numbers can be used when starting to cut 1/4 threads.

When cutting 1/2 threads (for example 4 1/2 threads), you can start on any one of the four numbers. After you have once started, you must make subsequent passes by dropping the halfnuts on either the same number you started with or the number opposite it on the dial. For example, if you start with NO. 1, subsequent passes can be made by dropping the half-nuts in either the NO. 1, or NO. 3 position, and if NO. 2 is used, half-nuts can be dropped in the NO. 2 or 4 positions. If you start with NO. 4, the NO. 4 and NO. 2 position can be used, etc.

If the thread being cut is an odd number per inch, that is 5, 7, 9, 11 etc., you can start with any number on the dial and on subsequent passes, you can drop the half-nuts on any one of the four numbers, that is 1, 2, 3, and 4.

If the number of threads being cut is 8, or any multiple of 8, that is 8, 16, 24, 32, 40, 48, 56, etc., it is not necessary to read the thread cutting dial.

Just drop the half-nuts on the lead screw anytime, which also applies to subsequent passes that might be made.

This does not mean that the thread cutting dial cannot be used with cutting these threads, the dial can be used if the operator so desires.

11" Lathes are equipped with a built in thread stop, as shown in Fig. 10-A. This photograph show s the bottom side view of the stop for clarity.

This exclusive built in thread stop enables you to cut threads faster and the chance of error is minimized.

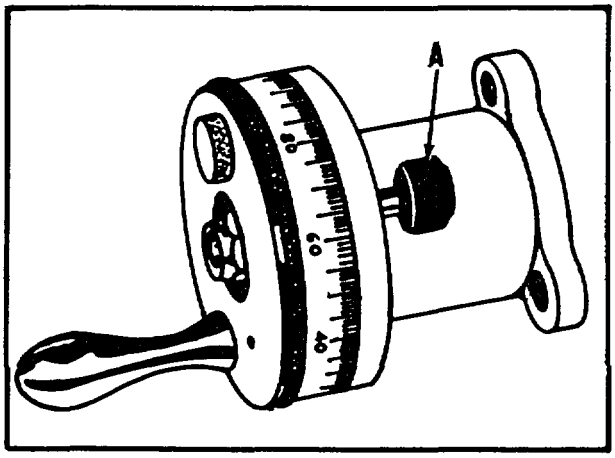


Fig. 10-A

When cutting threads the compound slide is usually set at 290, and the proper tool holder and thread cutting tool is adjusted in relation to the stock. Push in the knurled knob (A) Fig. 10-A to engage the thread stop and turn the cross slide handwheel clockwise until it engages the stop. Move the compound slide in until the cutting tool lust touches the work. Back out the cross slide and move the carriage until the tool is away from the work and clear of the end. Then move the cross slide in against the stop and proceed cutting by engaging the half-nuts.

When you are finished with the first cut, disengage the half-nuts, back out the cross slide, manually return the carriage to the starting position and move the cross slide in. The stop enables the cross slide to be in the same position for each successive cut and the tool is advanced by the compound slide for depth of cut.

To return the carriage to the starting position without this feature, you must reverse the rotation of the lead screw (which is a very slow procedure) or remember a mark on the micrometer collar of the cross slide when you originally position the cross slide. The latter method increases the possibility of error.

QUICK CHANGE GEAR BOX

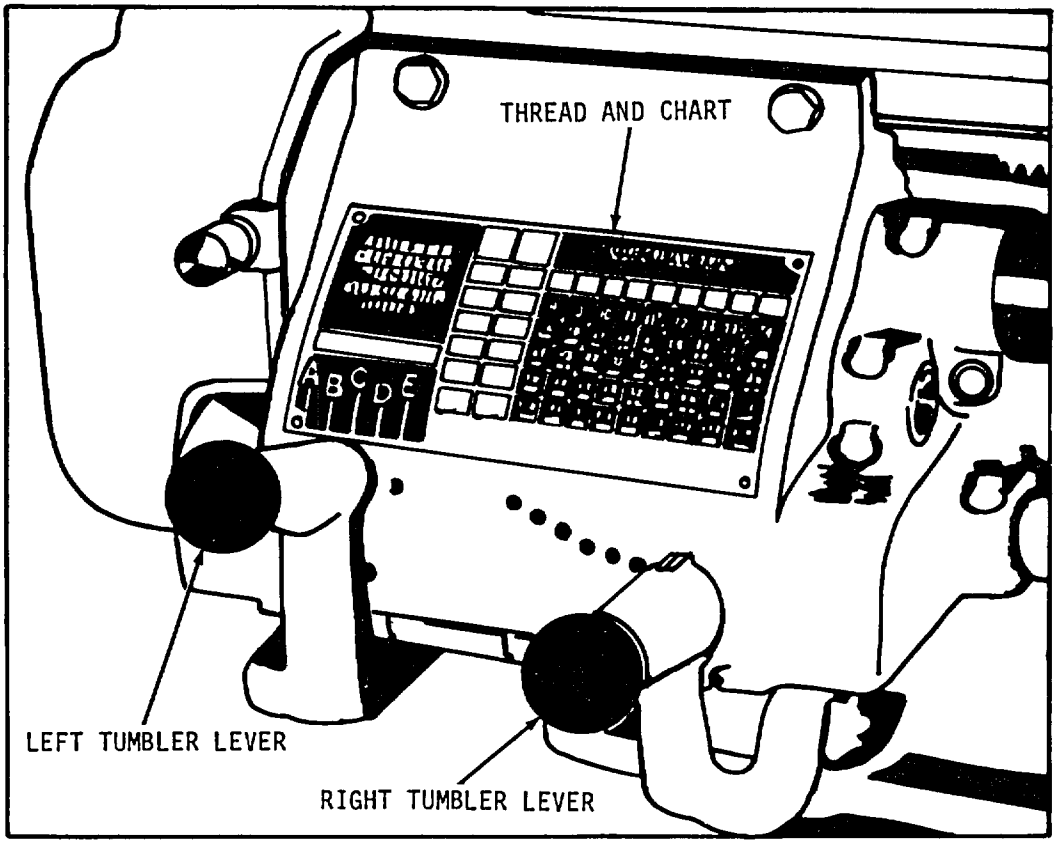


Fig 11.

Fifty-four threads from 4 to 224 per inch can be cut by shifting the left and right tumbler levers and by changing one stud gear In the gear train. This is a gear type transmission which allows the operator to quickly select 54 different speeds of the Lead Screw. These speeds are really 54 different ratios relative to the speed of the spindle of the headstock.

There are two input speeds of the gear box, obtained by exchanging the 24 tooth and 48 tooth stud gears mentioned above. The 48 tooth stud gear should be used only for chasing threads 4 through 7 pitch. The 24 tooth stud gear should be used for all other threads and for all power feeding. If this rule is violated, the thread and feed chart on the Quick Change Gear Box will not give correct readings.

With the Quick Change Gear Box set for any of the eighteen (18) thread pitches from 4 through 14, the power feeds which could then theoretically be used, are too fast for all practical purposes.

Therefore, in practice, the 48 tooth stud gear should not be used for power feeding, and the power feeds are not shown on the top two rows of the chart where threads 4 through 14 are indicated.

Some practice is required to get on to moving the tumbler levers smoothly from left to right or vice versa. Many operators extend the index finger of their right hand down along the lever, and exert a clockwise twisting pressure with their wrist when moving from right to left. A counterclockwise twisting pressure using either the left or right hand, is used to move either lever from left to right. When the tumbler lever cannot be lowered easily into the new position, the spindle should be turned slightly by hand, or jogged with the motor, to get the gears to mesh.

The left and right tumbler levers should be shifted only with the motor off, to avoid clashing the gear which might damage them, especially at high speeds. Both are shifted in the same fashion.

TAILSTOCK

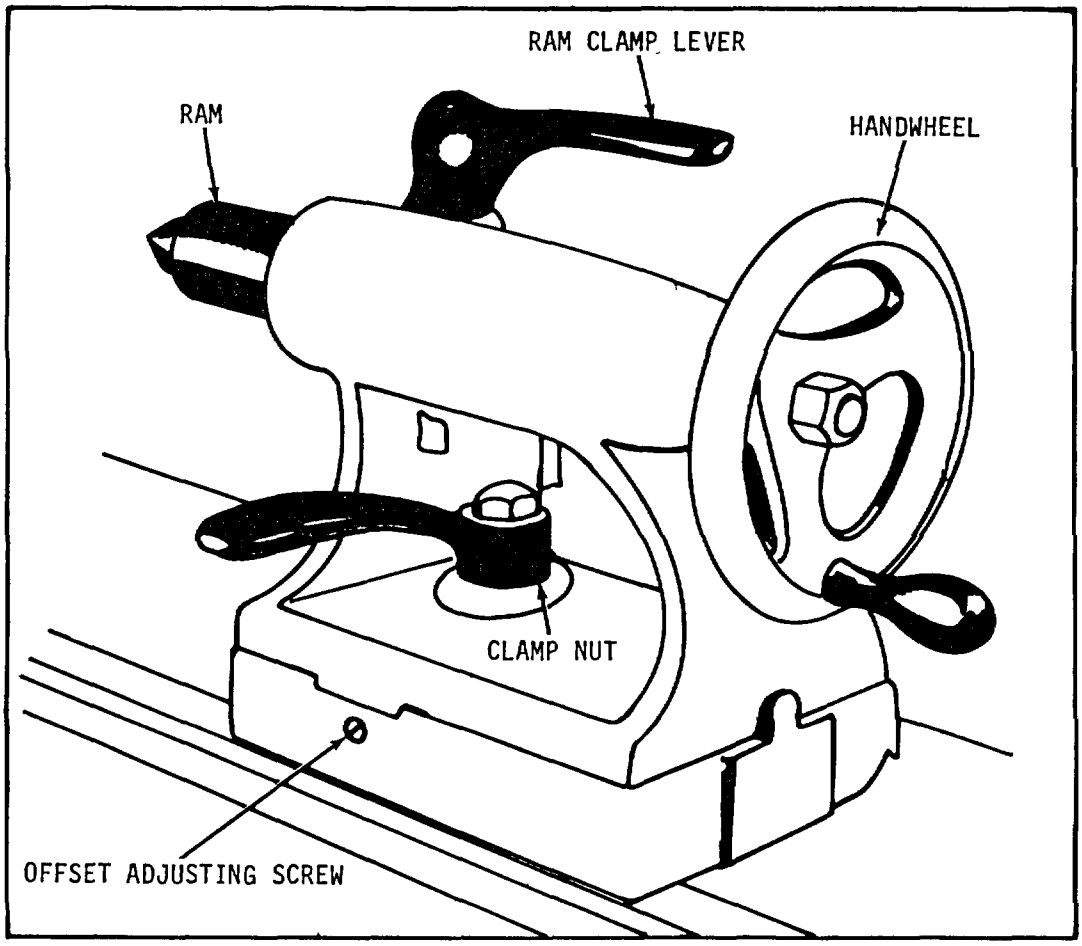


Fig. 12.

The box wrench which comes with the lathe is used to loosen or tighten the Clamp Nut that secures the Tailstock to the bed. With the Clamp Nut loose, the Tailstock can be moved by hand along the bed, or can be removed from the bed entirely by sliding it off the end.

The Tailstock can also be moved or "offset" for taper turning by means of the two Offset Adjusting Screws. First loosen either screw, and then tighten the other to "offset" the tailstock. The amount of movement is measured by the witness marks on the outboard end of the tailstock. The Clamp Nut must be loose before this adjustment is made. After the desired "offset" is obtained, tighten previously loosened Screw, and check again to be sure the setting has not shifted. For straight turning and most every job except taper turning, the witness marks must be in line with each other.

The Ram Clamp Lever is loosened to release the Ram for feeding in or out.

The Handwheel is rotated in a clockwise direction to cause the Ram to feed out, and counterclockwise to retract the Ram. Turning the Handwheel counterclockwise will also eject or free from the Morse taper hole of the Ram a center, a taper shank drill, etc., after the ram has been retracted to a certain point.

The top of the Ram is graduated in one sixteenth inch (1/16") divisions, which can be used for reading the amount the Ram is fed out, for drilling, etc. It has a tang slot for positive drive of twist drills and other tools with a tang-type NO. 3 M.T. shank. Complete retraction of ram automatically ejects center. CAUTION: A drift pin should never be used in the tang slot to remove twist drills and other tools. The Ram has a witness mark at center height for easy positioning of cutting tool.

SERVICE ADJUSTMENTS

HEADSTOCK

ALIGNING BED WAYS PARALLEL TO SPINDLE

1. Mount a 4 jaw chuck on the spindle and insert a ground and polished test bar, approximately 1 1/2" to 2" in diameter and about 16" long.

2. True up the test bar by indicating 1 1/2" and 13 1/2" from the chuck. Rotate the test bar against an indicator at these positions, see Fig. 13. The total indicator reading should not exceed 0005 at either spot.

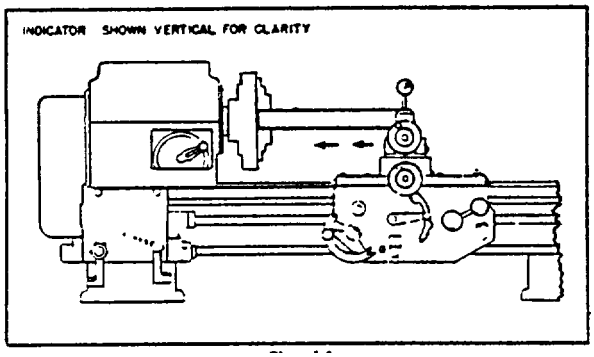


Fig. 14.

4. If an adjustment is necessary, loosen two bolts (A) Fig. 15, located at the front and rear of the left hand riser block under the headstock, adjust bushings (B) and retighten bolts (A). Repeat Step 3 and adjust further if necessary.

5. Occasionally the lathe should be rechecked and alignment adjustments made if necessary. If the lathe turns or bores a taper, it is an indication the machine is no longer in alignment.

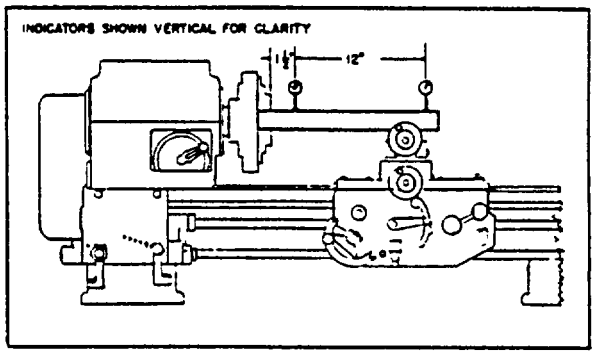


Fig. 13.

3. Mount the indicator on the tool post in a horizontal position, as shown in Fig. 14, and mote the indicator 12" along the test bar by feeding the carriage. The total indicator reading should not exceed .0005.

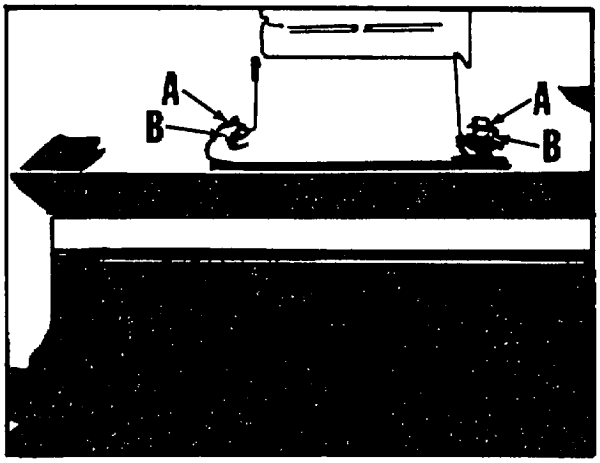


Fig. 15.

ADJUSTMENT OF SPINDLE BEARINGS

1. If the spindle should develop end play or spin too freely, loosen two set screws (A) Fig. 16, and tighten thrust nut (B) until the end play is removed and the spindle turns with a slight drag. THEN BACK OFF THRUST NUT (B) FIG. 16, 10 DEGREES TO PROVIDE PROPER PRELOAD OF THE BEARINGS. Retighten set screws (A).

2. Should you find the bearings running above 145 degrees farenheit the following procedure should be used to loosen the preload on the roller bearings of the lathe spindle. Loosen two set screws (A) Fig. 16, and loosen thrust nut (B) 180 degrees. Using a wooden mallet, strike the chuck end of the spindle, (be sure to protect the threads on the spindle). This impact will move the bearings apart. Now adjust bearings as described in Step 1.

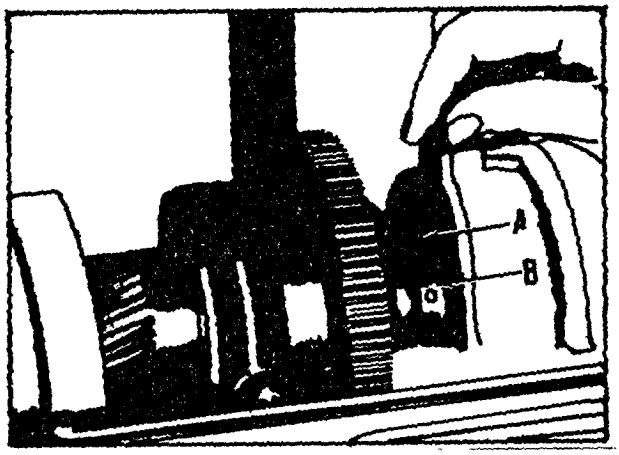


Fig. 16.

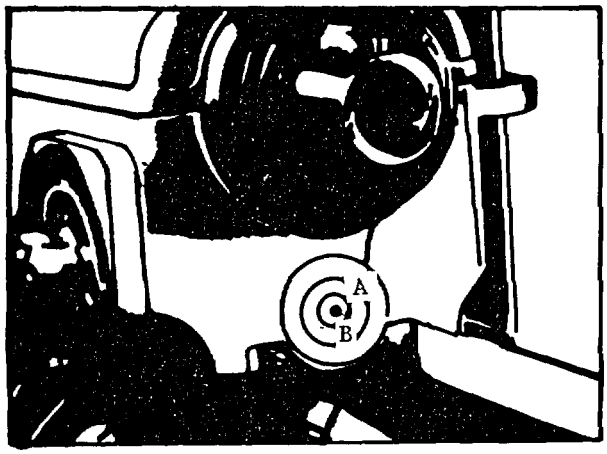


Fig. 17.

ADJUSTMENT OF DIRECT DRIVE DOG CLUTCH

If the dog clutch will not entirely disengage for loose spindle, or back gear settings, make the following adjustments:

1. Place lever (A) Fig. 18, in a vertical position as shown.

2. Remove two screws (B) Fig. 18.

ADJUSTMENT OF BACK GEARS

1. No adjustment of the back gears is necessary, since all the parts are factory fitted and the teeth meshed with proper back lash and the whole assembly dowelled. If, however, the back gears have been disassembled. realign the witness marks (A and B) Fig. 17, as described in Step #6 on Page 27 under Removing and Replacing Outboard Spindle Bearing, Spindle V-Belts, and Back Gears.

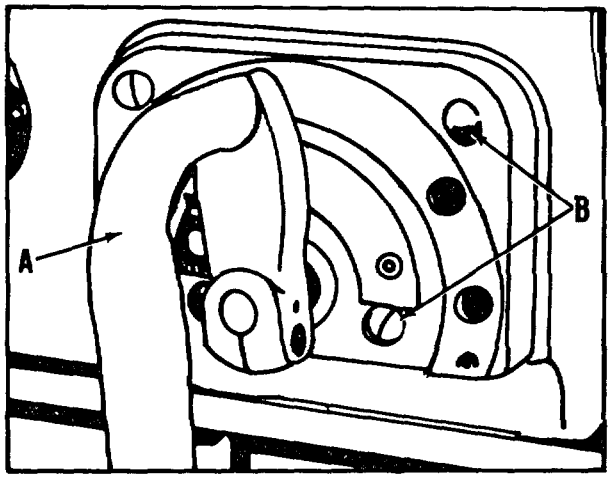


Fig. 18.

3. Place lever in loose spindle position as shown in Fig. 19, and remove screw (A) and pin (B). Then remove lever (C) from shaft.

4. Carefully remove cover 0D) Fig. 19, after first removing remaining screws. Care should be taken to hold shaft (E) in place so that It will not withdraw with cover plate.

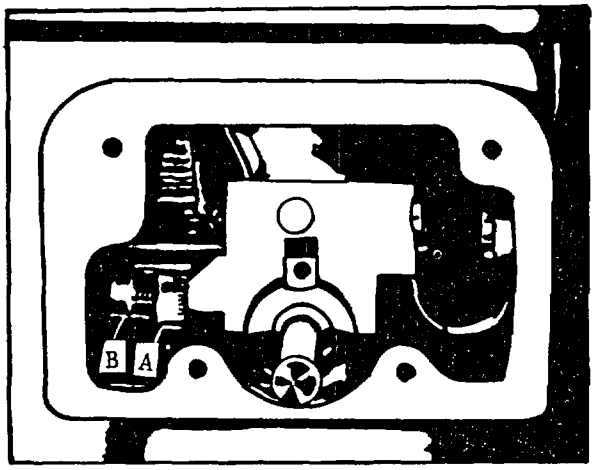


Fig. 20.

ADJUSTING SAFETY LOCK-OUT FEATURE

The safety lock-out disc (A) Fig. 21, must be adjusted so it is not in contact with the belts and not more than 1/16" away from the belts, when the motor is turned off and the drive selector lever engaged in any of the four positions.

This adjustment should be visually inspected periodically or checked immediately if it is possible to disengage the drive selector lever from the hole with the motor running.

To adjust, remove headstock cover, loosen nut (B) and turn safety lock-out disc (A) Fig. 21 in or out so that it is not In contact with the belts and not more than 1/16" away from the belts. Then lock nut (B) Fig. 21. This adjustment should be made with the drive selector engaged.

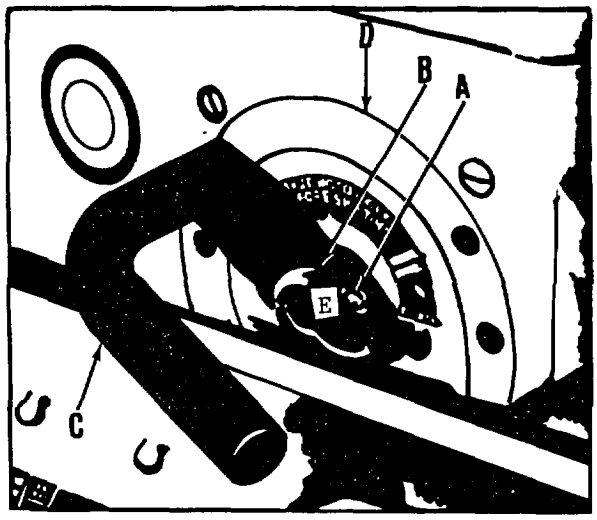


Fig. 19.

5. Make clutch adjustment by loosening lock nut (A) and turning screw (B) Fig. 20.

6. Check clearance by rotating spindle. Clutch should be completely disengaged when the lever is in the loose spindle position.

7. Tighten lock nut (A) Fig. 20, and reassemble handle and cover.

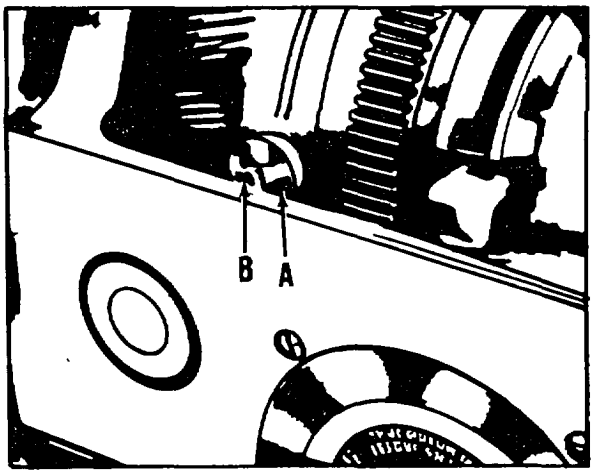


Fig. 21.

ADJUSTING DRIVE SELECTOR LEVER

If it ever becomes Impossible to pull the drive selector lever out of whichever drive position in which it Is being used, even with the spindle stationary, the following adjustment should be made.

1. Remove the drive selector lever and cover plate by following Steps 1, 2, 3, and 4 under ADJUSTMENT OF DIRECT DRIVE DOG CLUTCH.

2. Move the flat spring (\) Fig. 22, up or down until there is equal clearance between the dog plate (B) and the cam (D). The spring is moved up or down by loosening screws (C) which holds one end of the spring against the headstock body casting.

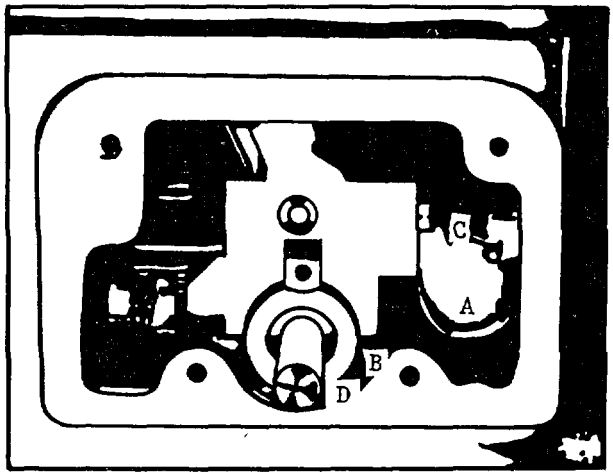


Fig. 22

OUTBOARD GEAR TRAIN

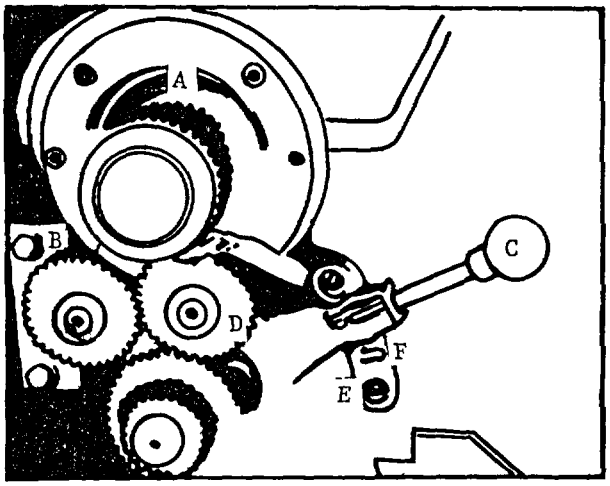


Fig. 23.

ADJUSTING BACK LASH

Proper back-lash of the gears of *our lathe has been set at the factors, however, after considerable use, adjustments max be necessary.

To establish back-lash between gears (A) and (B) Fig. 23, when the feed reverse lever (C.) is in the up position, and between gears (A) and (D) when the feed reverse lever is in the down position, proceed as follows:

1. Place a strip of wrapping paper between gears (A) and (B) Fig. 23, and place the feed reverse lever in the up position.

2. Rotate the gears expelling paper and continue through one full revolution of larger gear to make certain no binding occurs at any point. In other words there should be some back-lash between any given point of the gears' mating circumference.

3. If an adjustment is necessary, loosen two screws Fig. 23, and move the bracket (F) until the desired back-lash is obtained. Then tighten two screws (E).

4. When proper back-lash between gears (A) and (B) Fig. 23 is obtained, proper bark-lash will automatically be obtained between gears (A) and (D).

CARRIAGE

GIB ADJUSTMENT FOR COMPOUND SLIDE

1. A gib is provided to take up all play between the mating dove tailed ways of the compound slide and swivel base. Should the compound slide move too freely or bind, it is necessary to readjust the gib (A) Fig. 24.

2. To make this adjustment, first be sure that the mating surfaces are-clean and coated with a thin film of light machine oil. Then adjust the three hexagon socket cone pointed set screws (A) Fig. 25.

3. Each set screw should be loosened or tightened approximately the same amount until a good, snug, sliding fit is obtained.

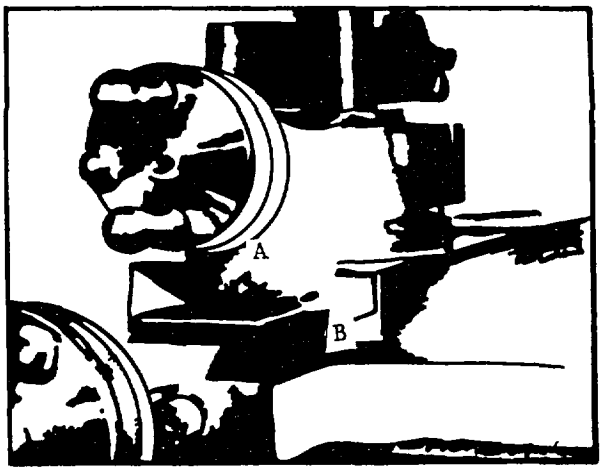


Fig. 24.

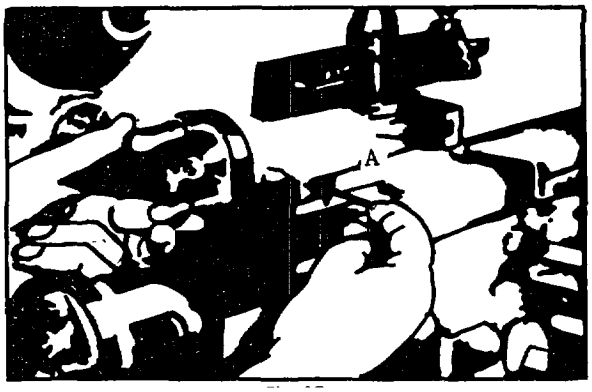


Fig. 25.

GIB ADJUSTMENT FOR CROSS SLIDE

1. Follow the same procedure for adjusting the cross slide gib (B) Fig. 24, as for gib adjustment for the compound slide.

COMPOUND SLIDE FEED SCREW END PLAY ADJUSTMENT

1. To remove end play of the compound slide reed screw, tighten nut (A) Fig. 26.

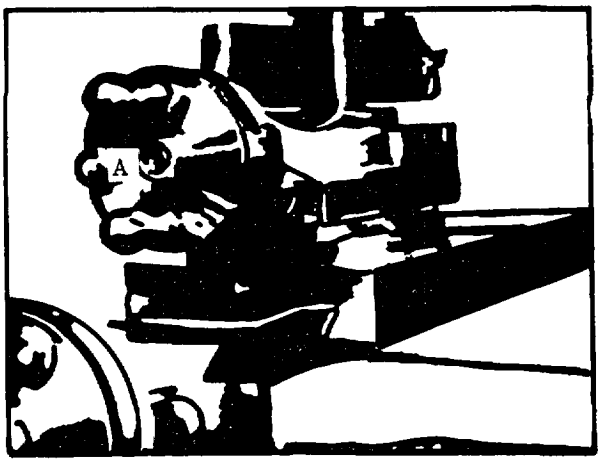


Fig. 26.

CROSS SLIDE FEED SCREW END PLAY ADJUSTMENT

1. To remove end play of the cross slide feed screw, loosen lock nut (A) Fig. 27, make the adjustment by tightening nut (B). When correct adjustment is obtained tighten lock-nut (A) Fig. 27.

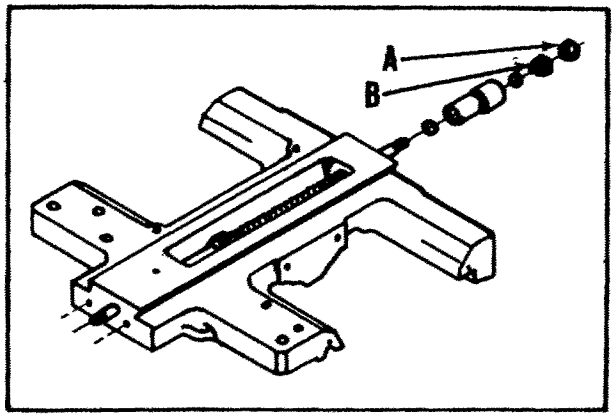


Fig. 27.

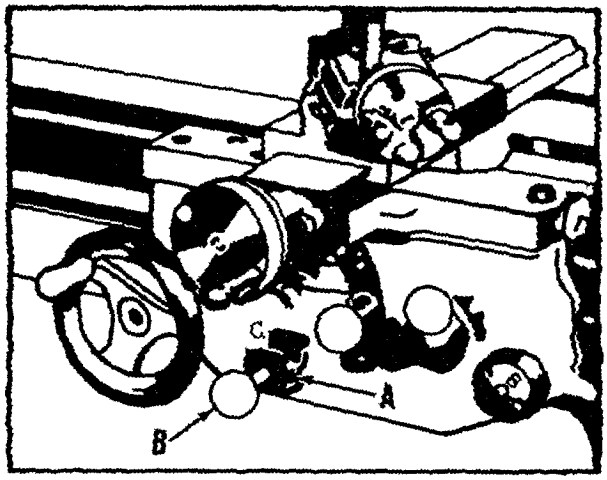


Fig. 28.

ADJUSTING HALF-NUTS

The half-nuts can be adjusted for wear by closing them in further on the threads of the lead screw, as follows:

1. Close the half-nuts by turning lever (A) Fig. 29, clockwise as far as it will go.

2. Loosen two set screws (B) Fig. 29, allowing hub (C) to turn freely on shaft CAUTION: To retain the stop parts of the hub in their proper place, always 'keep the hub (C) against the apron.

3. With the half-nuts closed, move lever (A) Fig. 29, counterclockwise a few degrees and retighten set screws (B).

4. Check to make sure lead screw does not bind when half-nuts are closed.

POWER FEED CLUTCH ADJUSTMENT

Loosen set screw located on left end of shaft (A) Fig. 28, and rotate lever (B) clockwise full turns, not half turns, until proper tension is obtained, and retighten set screw. If, however, this adjustment is too tight and one full turn counterclockwise proves to be too loose, a half turn is necessary. This means that the stop bracket (C) Fig. 28, must be rotated so as to have the stop part on top for proper operation of the clutch lever. To do this, loosen set screw, rotate lever (B) and stop (C) together until disengaged from clutch shaft. Do not lose the relative position of the stop to the lever when disengaged, but carefully rotate the stop (C) 1/2 turn and reassemble to clutch shaft.

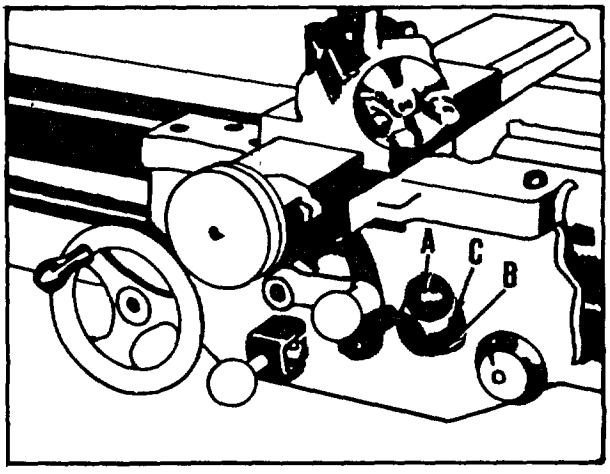


Fig. 29.

REMOVING END PLAY FROM LEAD SCREW

1. Place feed selector lever (A) Fig. 30, in the middle notch.

2. Move lever for half-nuts (B) Fig. 30, down to thread cutting position.

3. Loosen set screw (C) and move collar (D) Fig. 30, against boss of casting (E).

4. Turn apron handwheel (F) clockwise applying light pressure. After clockwise rotation of apron handwheel has stopped, tighten set screw (C) in collar (D), keeping collar against the end of casting boss (E), Fig. 30.

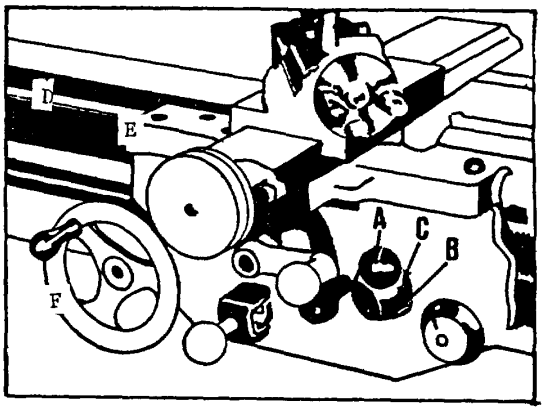


Fig. 30.

BELT TENSION

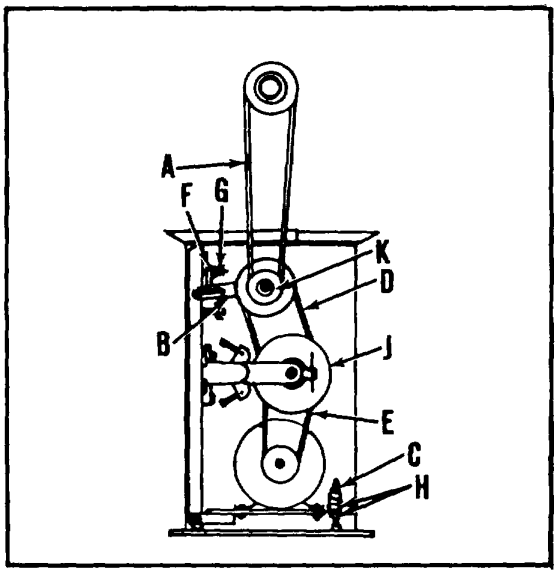


Fig. 31.

BELT TENSION FOR SPINDLE V-BELTS

To increase tension on the spindle V-Belts (A) the jackshaft mounting bracket (B) Fig. 31, must be shifted down. This may be done as follows:

1. Loosen nut (C) Fig. 31, on the motor mounting plate so the variable speed drive belts (D) and (E) have considerable play.

2. Loosen nut (F) Fig. 31, and tighten screw (G) until the spindle belts,(A) have the desired tension. Then tighten nut (F).

BELT TENSION FOR VARIABLE SPEED BELTS

Tension adjustment for the variable speed belts (D) and (E) Fig. 31. is made by tightening or loosening the nuts (C) and (H) on the motor mounting plate.

TAILSTOCK

REMOVING EXCESS PLAY IN TAILSTOCK HANDWHEEL

1. To remove excess play in the tailstock handwheel, tighten the self locking nut (A) Fig. 32.

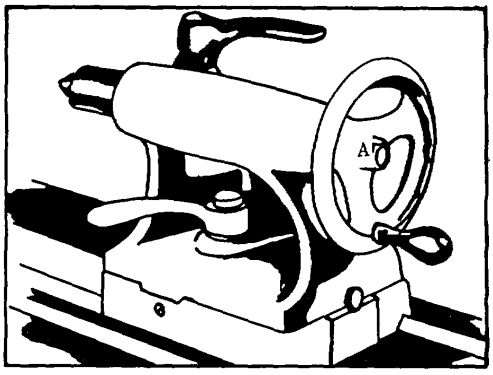
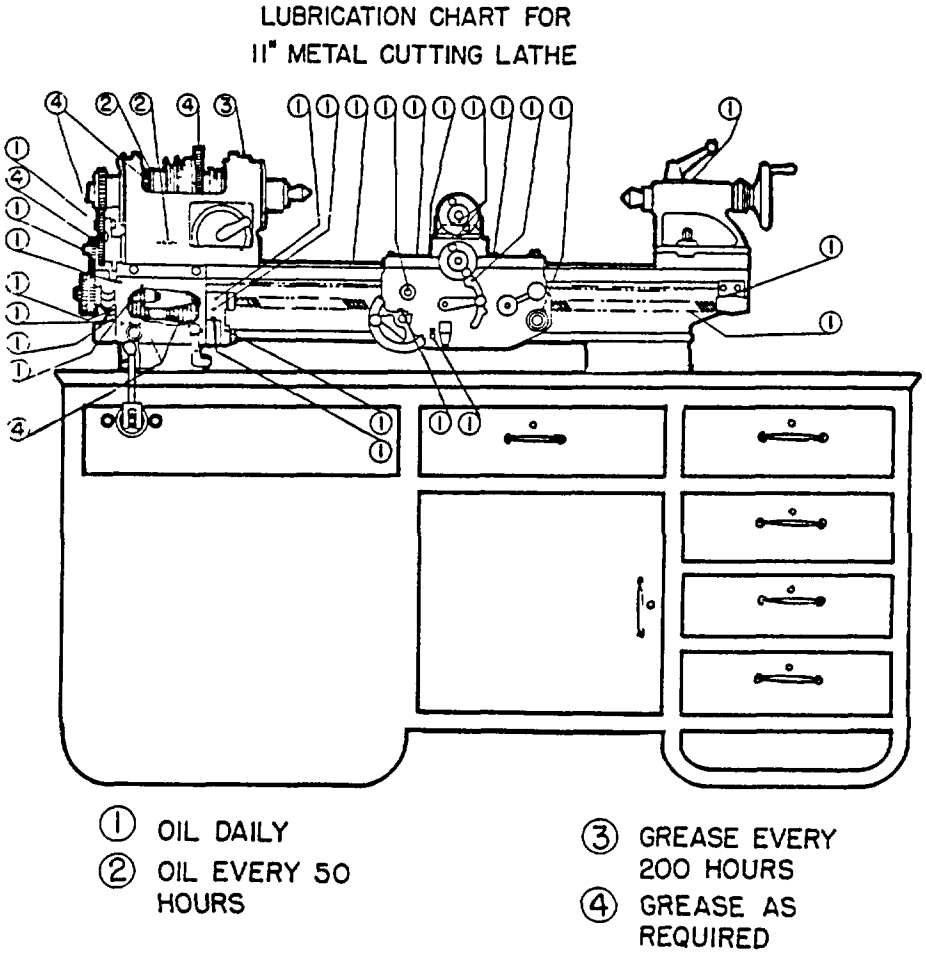


Fig. 32.

LUBRICATION



POINTS #1 & #2 REQUIRE Gear Oil, MIL-L-2105 (NSN 9150-00-240-2246)
POINTS #3 REQUIRE Grease, General Purpose, MIL-G-23549
POINTS #4 REQUIRE Grease, General Purpose, MIL-G-23549

MAINTENANCE AND REPAIRS
HEADSTOCK

REMOVING AND REPLACING VARIABLE SPEED BELTS, FEED REVERSING GEAR BRACKET, OUTBOARD SPINDLE BEARING, SPINDLE V- BELTS, AND BACK GEARS

DISASSEMBLY

1. Set drive selector lever to direct drive position.

2. Unscrew nut (C) Fig. 33, on the motor mounting plate.

3. Raise the motor and remove lower variable speed belt (E) Fig. 33.

4. Raise the variable speed pulley (J) Fig. 33, by moving the variable speed control lever. Release tension on spindle belts (A) by loosening nut (F) and screw (G) Fig. 33. Remove spindle belts ((A) from jackshaft pulley (K). Then remove the upper variable speed belt (D).

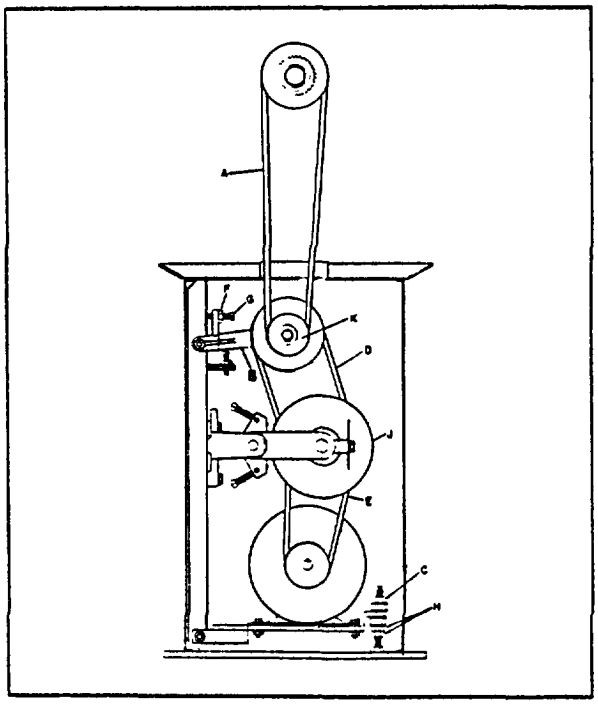


Fig. 33.

5. Remove outboard gear cover and headstock cover.

6. Loosen bolt (A) Fig. 34, of the gear train. Rotate the gear bracket (B) counterclockwise disengaging the gear train.

7. Remove nut (C) Fig. 34, washer (D), and reversing gear bracket (E).

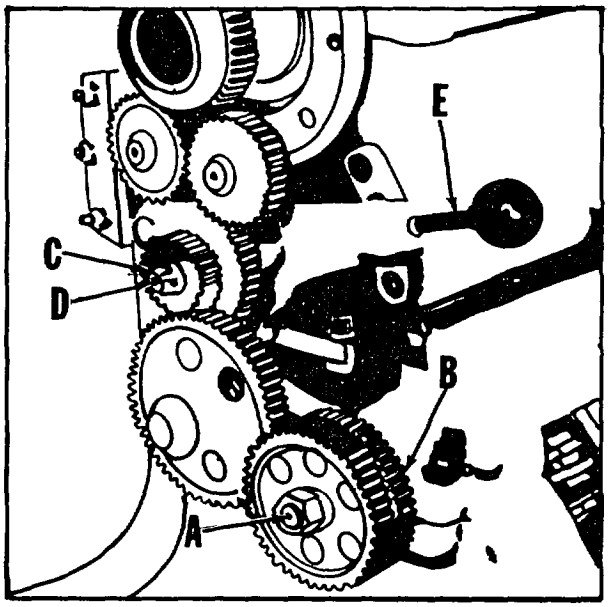


Fig. 34.

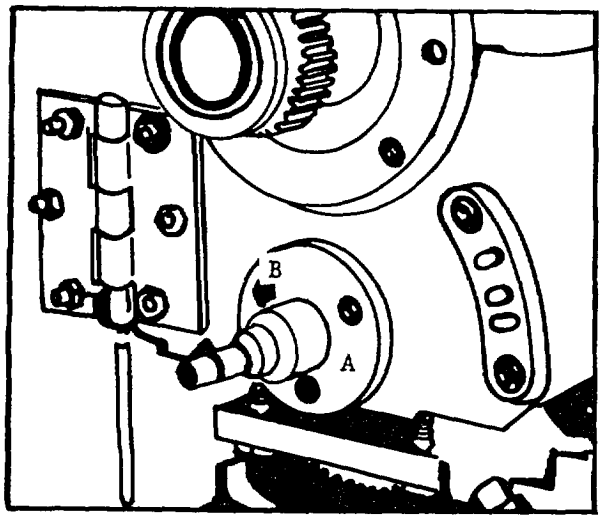


Fig. 35.

8. Remove shoulder bushing (A) Fig. 35, by removing three screws (B).

9. Loosen set screw (A) Fig. 36, and remove spindle nut (B). CAUTION: Care should be taken not to lose brass plug below set screw (A). Remove gear (C), key (D), and spacer (E) Fig. 36.

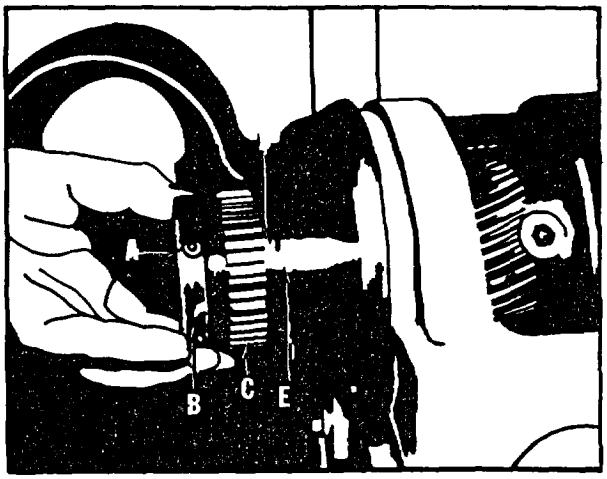


Fig. 36.

10. Remove four cap screws from outboard bearing retainer.

11. Remove outboard bearing retainer (A) Fig. 37, by screwing two 3/8-16 x 2" screws into the tapped holes as shown. Tighten the two screws evenly until the outboard bearing retainer pulls free. The outboard bearing is removed with the outboard bearing retainer.

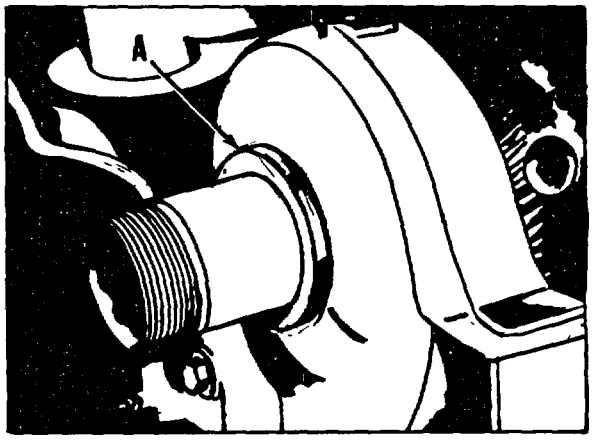


Fig. 38.

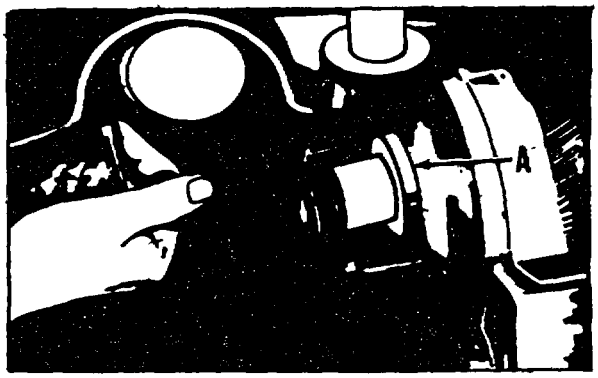


Fig. 37.

12. Remove spindle spacer (A) Fig. 38.

13. Remove the four mounting bolts and the two mounting plates that hold the headstock to the lathe bed.

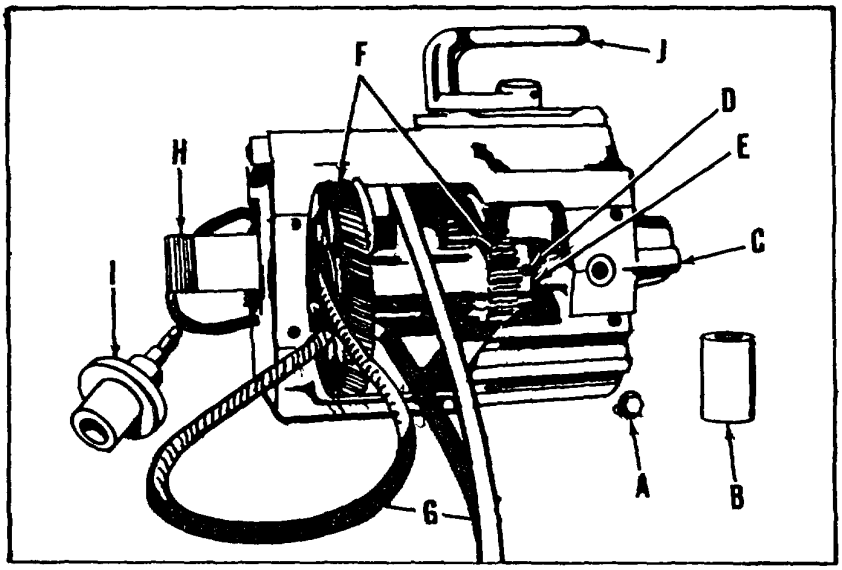


Fig. 39.

14. Remove the headstock from the lathe bed and lay it on its side with the drive selector up, as shown in Fig. 39.

15. Remove bolt (A) Fig. 39, from the bottom of the headstock and remove bearing (B) which supports lower back gear shaft (C).

16. Loosen set screw (D) in collar (E) Fig. 39, slide back gears (F) to the right just far enough to remove belts. Do not remove shaft (C).

17. Remove belts (G) Fig. 39, by slipping them through the outboard spindle bearing hole, past the end of the spindle (H), back through the outboard spindle bearing hole, and down past the back gears (F).

REASSEMBLY

1. Reverse Step 18 to assemble new spindle V-Belts around Spindle Pulleys.

2. Fasten shoulder bushing (I) Fig. 39, to headstock.

3. Put selector lever (J) Fig. 39, into direct drive position.

4. Push shaft (C) into shoulder bushing (I) Fig. 39.

5. Replace bearing (B) and bolt (A) Fig. 39. Care must be taken to see that witness mark on bearing (B) is toward the outside and pointing up toward the spindle.

6. Check to see if witness mark on shaft (C) Fig. 39 and bearing (B) coincide (with selector lever still in direct drive). If not, remove bolt (A) and bearing (B) and repeat Steps 4 and 5 rotating the shaft until gears mesh in the correct position so that the witness marks on bearing (B) and shaft (C) coincide. The gears referred to are the small gear on shaft (C) and the small gear on the inboard end of the shaft which is rotated by the drive selector. The proper engagement of these gears is necessary for the witness marks to coincide and for the proper backlash setting of the back gears.

7. Move back gears (F) to left side and fasten with collar (E) and set screw (D) Fig. 39.

8. Replace spacer (A) Fig. 38, with chamfered end toward the outside.

9. Insert extended loose ends of belts through bed and chip pan opening while placing headstock on lathe bed.

10. Reach through cabinet door and pull belts down.

11. Fasten the headstock to the lathe bed using the four mounting bolts and two mounting plates. End of headstock should be approximately flush with end of ways of bed before tightening bolts.

12. Reverse Steps 1 through 13 under REMOVING AND REPLACING VARIABLE SPEED BELTS, FEED REVERSING GEAR BRACKET, OUTBOARD SPINDLE BEARING, SPINDLE V-BELTS, AND BACK GEARS.

QUICK CHANGE GEAR BOX

REPLACING LEFT AND RIGHT HAND TUMBLERS

1. Disengage lead screw from gear box by loosening set screw (A) Fig. 40 and moving lead screw to the right a few inches.

2. Remove three screws (B) Fig. 40 and remove gear box from the lathe.

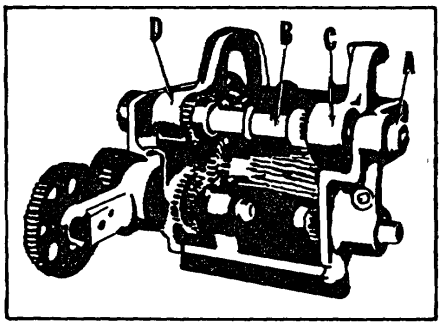


Fig. 41.

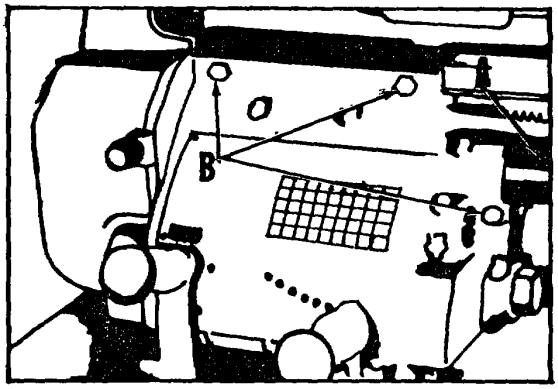


Fig. 40.

3. Loosen set screw in collar (A) Fig. 41, and remove the collar.

4. Slide the shaft (B) to the left as viewed in Fig. 41, and remove and replace the tumblers (C) and (D).

5. Reverse the above instructions when reassembling the gear box.

CARRIAGE

REPLACING CROSS SLIDE RED SCREW AND NUT

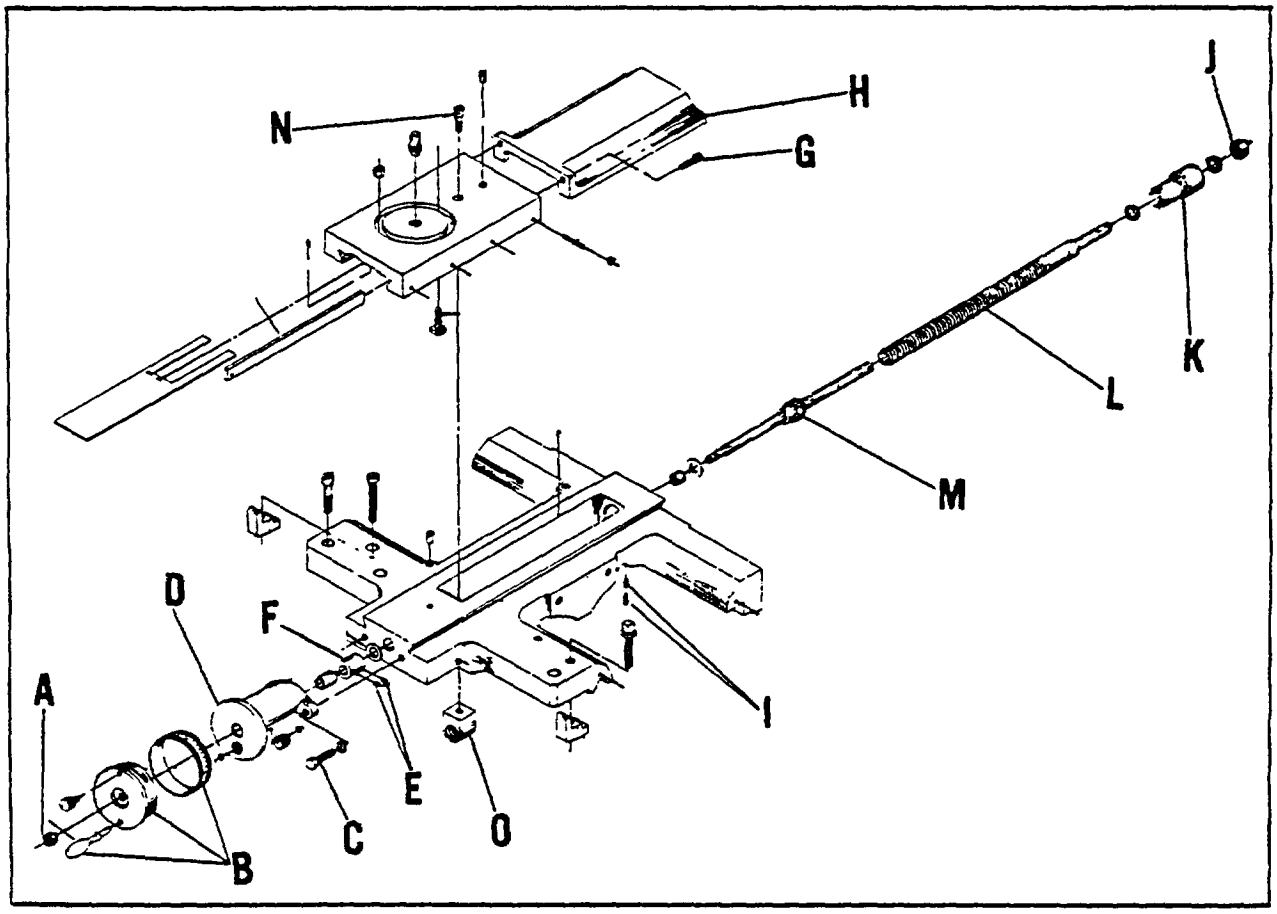


Fig. 42.

1. Remove nut (A) and handwheel assembly (B) Fig. 42.
2. Remove two screws (C) and flange (D) Fig. 42.
3. Loosen two set screws (E) and remove collar (F) Fig. 42.
4. Remove two screws (G) and remove cover (H) Fig. 42.
5. Remove two set screws (I) Fig. 42.
6. Remove nuts (J) and bushing (K) Fig. 42.
7. Remove the feed screw (L) and feed shaft (M) Fig. 42 by threading them out through the rear.
8. Remove screw (N) and feed nut (0) Fig. 42.
9. When reassembling make sure the feed screw (L) runs freely through the feed nut (O) before tightening screw (N) Fig. 42.

REPLACING COMPOUND SLIDE FEED SCREW AND NUT

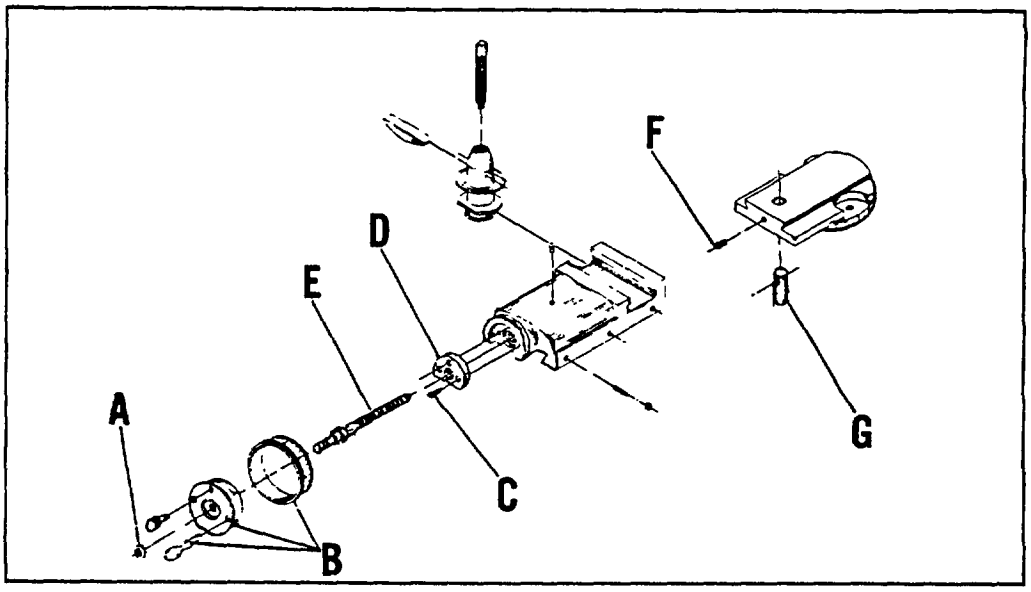


Fig. 43.

1. Remove nut (A) Fig. 43, and handwheel assembly (B).
2. Remove three screws (C) and thrust bushing (D) Fig. 43. Then remove the compound slide feed screw (E) by turning it counterclockwise.
3. Loosen set screw (F) and remove the feed nut (G) Fig. 43.
4. When reassembling make sure the compound feed screw (E) runs freely through the feed nut (G) before tightening set screw (F) Fig. 43.

REPLACING HALF NUTS, POWER FEED CLUTCH, AND WORM

To make repairs to the apron it is first advisable to remove the carriage from the bed, as follows:

1. Remove the tailstock from the lathe.

2. Remove the two screws on the lead screw bracket and remove this bracket from the right hand side of the bed.

3. Loosen the three cap screws (A) Fig. 44, enough so that the apron will drop about a quarter of an inch.

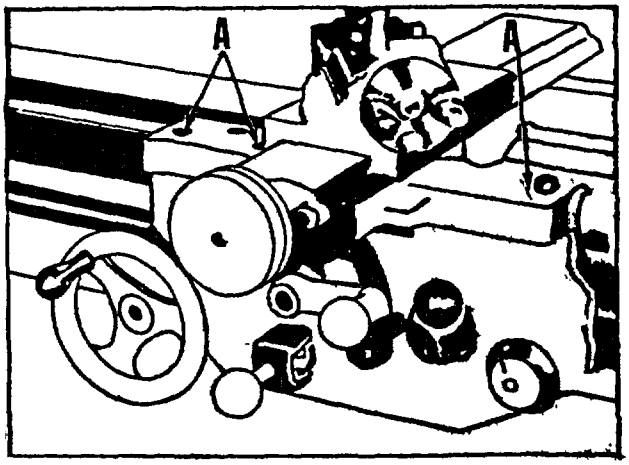


Fig. 44.

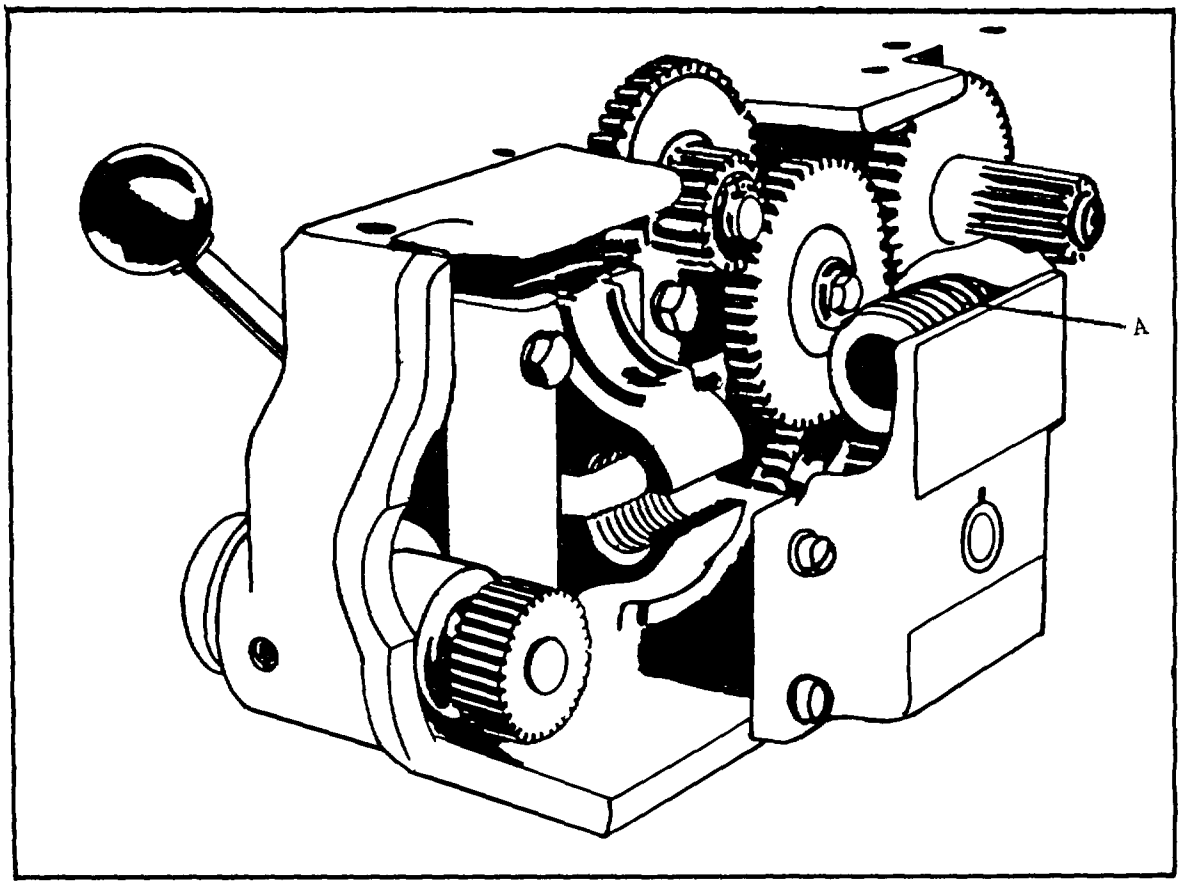


Fig. 45.

4. Move the carriage to the right and off the lathe bed.

5. The half-nuts, power feed clutch, and worm can now be replaced. Fig. 45 shows an Interior view of the apron.

6. When reassembling the apron be sure to engage the key in the worm gear (A) Fig. 45, into the keyway in the lead screw and move the carriage onto the bed. When tightening the three screws (A) Fig. 44, move the apron handwheel back and forth to allow the lead screw and pinion in apron to mesh. Before tightening the two screws on the lead screw bracket, run the carriage the full length of the lathe to make sure no binding occurs.

11" METAL CUTTING LATHE

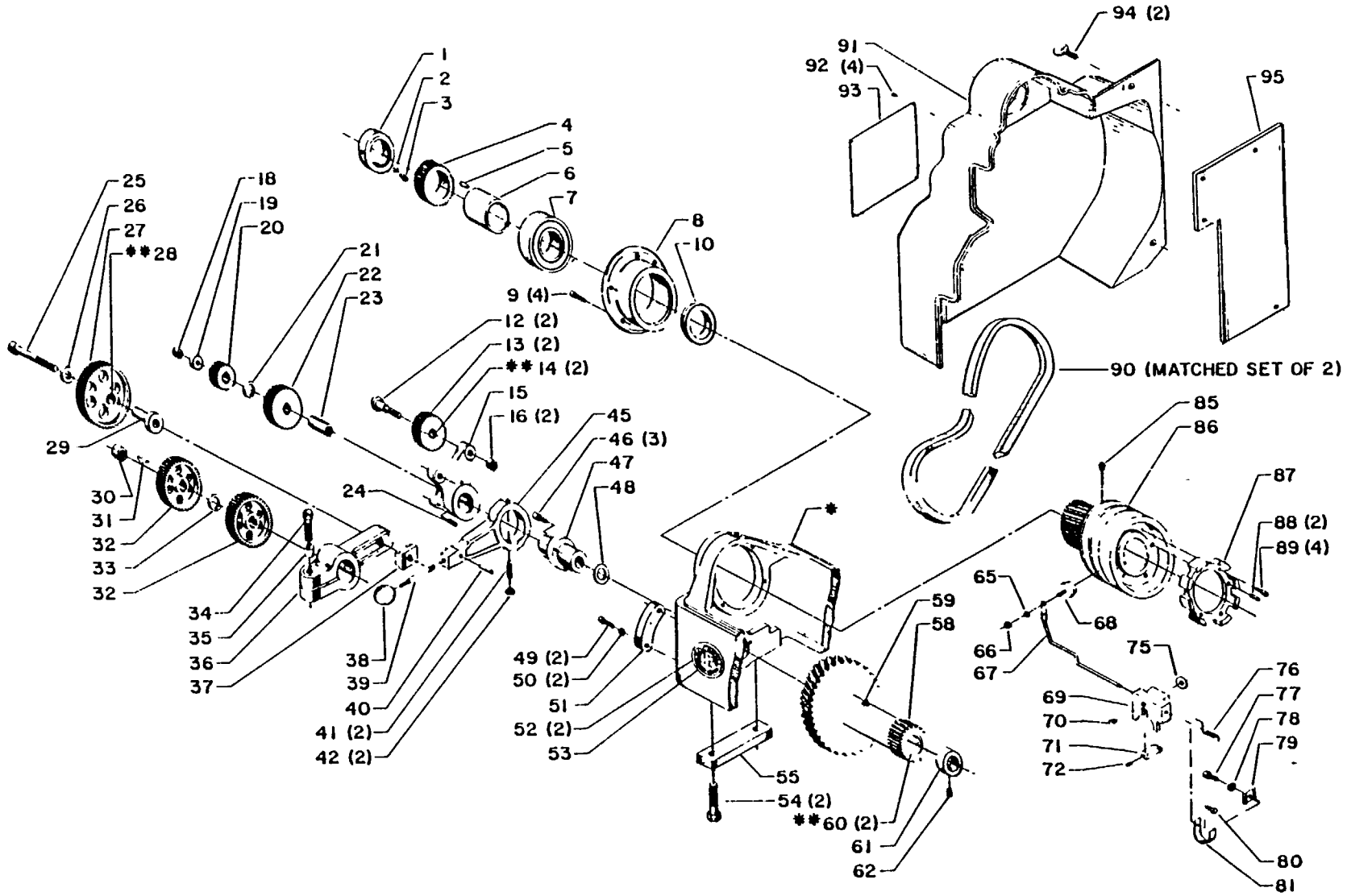
The 11" Metal Lathe is built to give you many years of good service. PLEASE STUDY THE INSTRUCTION MANUAL CAREFULLY BEFORE OPERATING THE LATHE. Keep the lathe clean, well lubricated, and in proper adjustment. The accuracy of work it produces depends on you.

Dial Indicator Inspection

	TEST	Limit Allowed	This Lathe
1.	Spindle Nose Runout (Indictor on Face and Pilot of Threaded Nose Models)	.0005 T.I.R.	
2.	Spindle Taper Hole Runout-Test Bar in Spindle Hole-Indicate 1½" from Spindle Nose	.0005 T.I.R.	
3.	Spindle Taper Runout-Test-Bar in Spindle Hole-Indicate 12" from Spindle Nose	.001 T.I.R.	
4.	Spindle Alignment with Bed ways-Vertical -along 12" of test bar	.001	
5.	Spindle Alignment with Bed ways-Hori. zontal-along 12" of test bar	.0005	
6.	Tailstock Ram Alignment with Bed ways-Vertical-long 3" Test Bar mounted in extended Ram-high at Headstock end	0 to .0015	
7.	Tailstock Ram Alignment with Bed Ways-Horizontal-along 3" Test Bar mounted in extended Ram	.001	
8.	Vertical Alignment of Head and Tail Centers (High at Tailstock)	0 to .003	
9.	Cross Slide Alignment-To Face Hollow or Concave only on 10" Diameter	.001 (5" Rad)	
10.	Lad Screw Cm Action	.0005	
11.	Cross Feed Screw Backlash (8 marks on mi crometer collar)	.004	
12.	Compound Feed Screw Backlash,	.006	
13.	Tailstock Feed Screw Backlash	.010	

Additional Inspection

	TEST .	Check If O.K.
1.	Bed Level-using spirit level in transverse and longitudinal directions	
2.	Travel of Carriage full length of bed, using handwheel	
3.	Lead Screw Alignment with Bed Ways-Vertical and Horizontal-end to end	
4.	Lead Screw-Lead per foot + or - .002; and Lead in any 4" + or - .00075	
5.	Lead Screw Control Lever (forward, neutral reverse)	
6.	Functioning of Half Nuts (lathe running)	
7.	Lock out Device for Half Nuts	
8.	Quick Change Gear Box-Check for noise or vibration with lathe running	
9.	Graduations on three Micrometer Collars and Compound Swivel Saddle. Witness Marks for Tailsock Set-over. Swivel Saddle (2). Eccentric Shaft for Back Gears, Shear Pin and three Micrometer Collar	
10.	Check Maximum and Minimum Spindle Speeds in Direct Drive (1550 and 220 rpm) using Stroboscopic Tachometer	
11.	Vibration at 1220 rpm not to exceed .0005" amplitude on Bed and .0003" at the Spindle using Electric Vibration Analyzer	
12.	Vibration from 220 to 1550 rpm not to exceed .005" amplitude on Variable Speed Drive Bracket, using Electric Vibration Analyzer	
13.	Turn and Face Drive Plate and pack with same lathe	
14	Make light and heavy cuts 6" long, and check for taper-not to exceed .0005"	
15.	Cut a coarse and a fine thread	
16.	Tailstock ejects center	

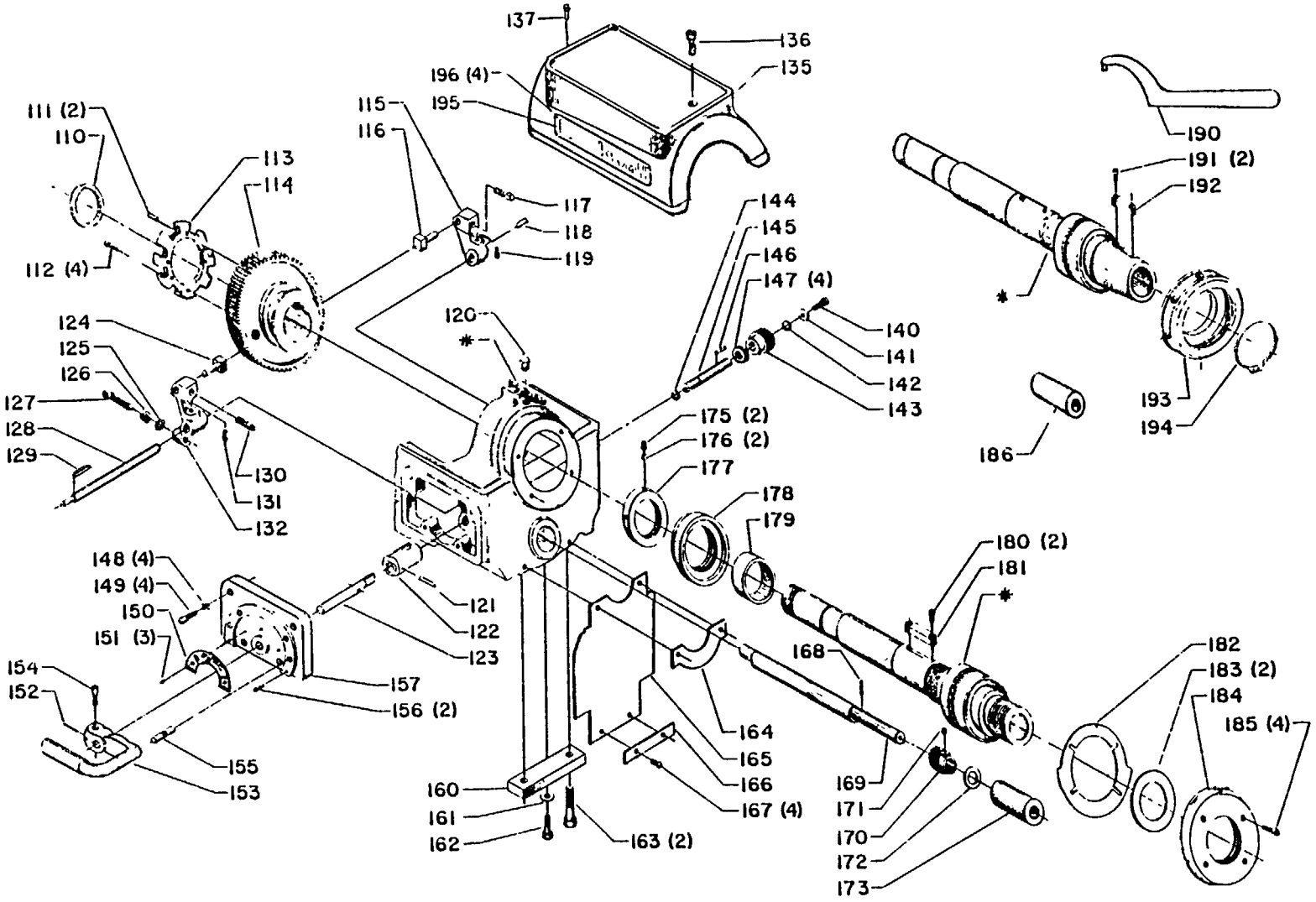


** REPLACEMENT BEARING ARE FURNISHED UNDERSIZE AND MUST BE REAMED TO FIT AFTER INSTALLATION.

Figure A

HEADSTOCK (Figure A)

R No.	Part No.	Description
1	MCL-233	Rear Collar Retainer
2	SCG-88	Plug
3	SP-225	5/16-18 x 1/4 Soc. Hd. Set Scr.
4	MCL-228	Spindle Change Gear - 40 Teeth
5	SP-2619	#404 Hi-Pro Key
6	MCL-234	Spacer
7	SP-5349	Bearing
8	MCL-243	Rear Bearing Retainer
9	SP-3309	1/4-20 x 5/8 Soc Hd. Cap Scr.
10	MCL-235	Spacer
12	MCL-256	Stud for Reversing Gear
13	MCL-231-S	Reversing Gear-34 Teeth, Including:
14	920-75-511-8057	Bearing
15	MCL-208	Bracket
16	SP-1207	3/8-24 Hex. Nut
18	SP-1206	5/16-24 Hex. Nut
19	MCL-248	Stud Gear Washer
20	MCL-230	Gear - 24 Teeth
21	MCL-254	Spacer
22	MCL-229	Gear - 40 Teeth
23	MCL-255	Bushing
24	DDL-123	Spring
25	MCL-310	Idler Bolt
26	DDL-174	29/64 x 1 x 1/8 Steel Washer
27	MCL-227-S	Intermediate Gear-60 Teeth, lncluding:
28	920-75-011-7190	Bearing
29	MCL-265	Bearing
30	SP-1282	1/2-13 Hex. Nut
31	SP-2606	1/8 x 5/8 Hi-Pro Key
32	MCL-176	Gear - 48 Teeth
33	MCL-254	Spacer
34	SP-6053	3/8-16 x 2 1/4 Sq. Hd. Collar Cap Scr.
35	MCL-314	Spacer
36	MCL-210	Bracket
37	MCL-253	'T Nut
38	931-01-022-0490	Knob
39	MCL-151	Handle Rod
40	SP-5075	1/4 x 3/4 Roll Pin
41	SP-133	1/4-20 x 1 Headless Set Screw
42	SP-1034	1/4-20 Hex. Jam Nut
45	MCL-209	Lever
46	SP-3309	1/4-20 x 5/8 Soc. Hd. Cap Screw
47	MCL-743	Shaft for Stud Gear
48	LTA-462	3/4 Fiber Washer
49	SP-3309	1/4-20 x 5/8 Soc. Hid. Cap Screw
50	SP-1702	1/4 Lockwasher
51	MCL-250	Bracket
52	SP-2250	Drive Screw
53	960-02-012-0028	Name Plate
54	SP-615	7/16-14 x 1 3/4 Hex. Hd. Cap Scr.
55	MCL-249	Clamp Block
58	MCL-224-S	Back Gear, Including:
59	SP-7107	Oiler
60	MCL-536	Bearing
61	MCL-241-S	Collar. Including:
62	SP-225	5/16-18 x 1/4 Soc. Hd. Set Sc.
65	SP-1775	#10 Int Tooth Lockwasher
66	SP-1203	#10-32 Hex. Nut
67	MCL-549-S	Rod
68	MCL-552-S	Retainer Pad
69	414-01-390-5005	Swivel Assembly Including:
70	MCL-551	Stud
71	MCL-558	Cam Follower
72	SP-258	#8-32 x 5/16' Soc Hd. Set Scr.
75	MCL-578	Shim Water
76	MCL-543	Torsion Spring
77	SP-626	1/4-20 x 3/4- Hex. Hd. Cap Scr.
78	SP-1764	1/4-' Int. Tooth Lockwasher
79	MCL-553	Clamp Plate
80	901-02-181-6103	#10-32 x 3/8' Hex. Hd. Mach. Scr.
81	MCL-544	Return Spring
85	SP-7107	Oiler
86	414-01-351-5032	Pulley with Gear-44 Teeth L H.
87	MCL-430	Clutch
88	SP-2729	3/16 x 1/2 Roll Pin
89	901-03-111-9980	10-24 x 1/2 Soc Hd. Cap Scr. -Nylon Insert
90	Cat. # 25-502	V-Belt(Matched set of Two)
91	414-01-354-5004	Guard Assembly, incl:
92	SP-2252	#2 x 3/16 Drive Screw
93	414-01-072-5009	Lubrication Chart
94	901-04-261-4014	5/16-18 x 5/8 Thumb Screw
95	414-01-014-5022	Bracket

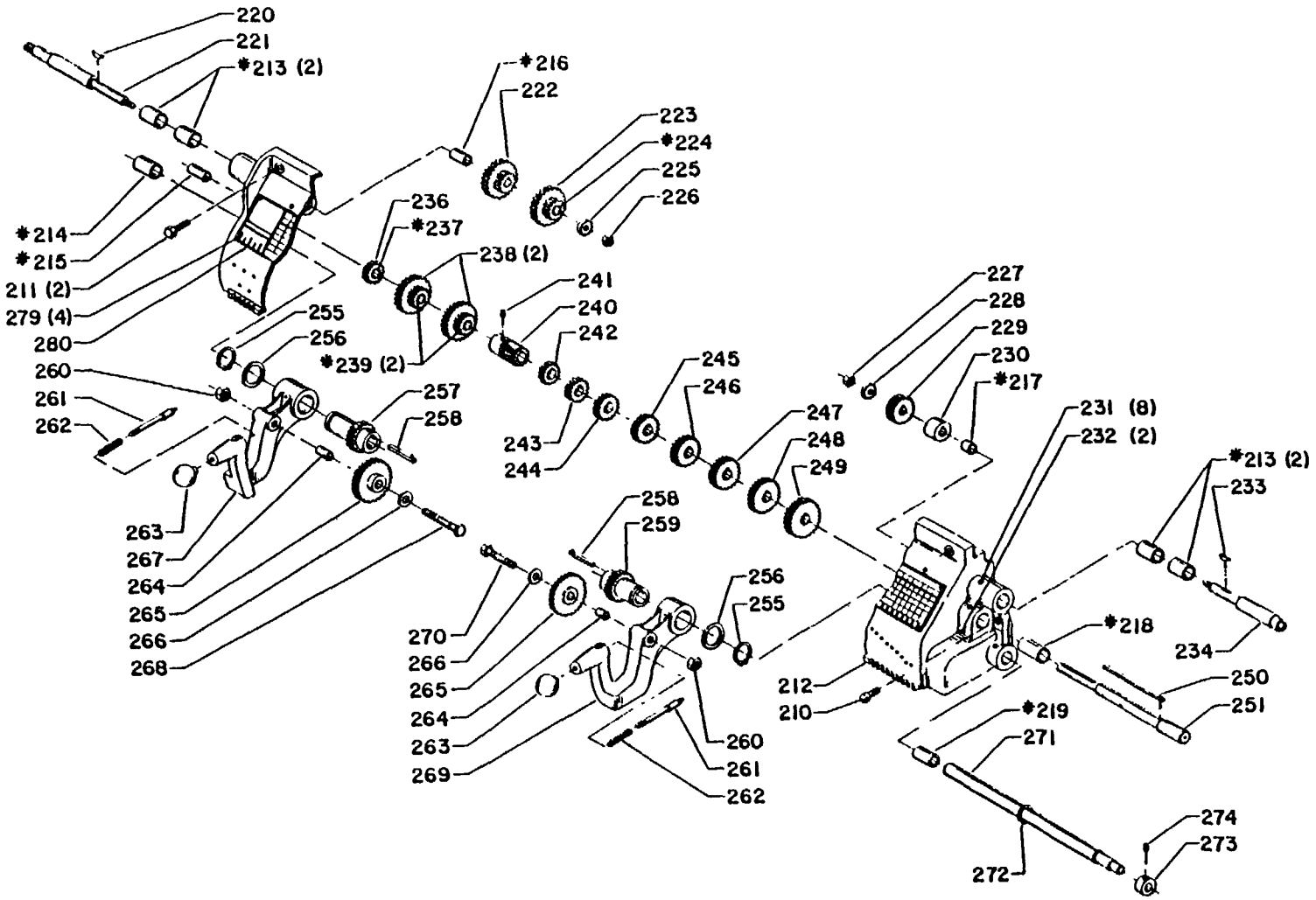


HEAD STOCK

Figure B

HEADSTOCK (Figure B)

R No.	Part No.	Description	Ref. No.	Part No.	Description
110	MCL-236	Spacer	160	MCL-249	Clamp Block
111	SP-2729	3/16 x 1/2 Roll Pin	161	SP-1605	3/8 x7/8 x 1/16 Washer
112	901-03-111-9980	#10-24 x 1/2 Soc. Hd. Cap Scr. -Nylon Insert	162	SP-607	5/16-18 x 3/4 Hex. Hd. Cap Scr.
113	MCL-430	Clutch	163	SP-615	7/16-14 x 1 3/4 Hex. Hd. Cap Scr.
114	MCL-223	Spindle Gear - 104 Teeth	164	MCL-296	Retainer Plate
115	MCL-232	Sliding Gear Arm	165	MCL-297	Splash Guard
116	414-03-047-5001	Shifter Arm Shoe	166	MCL-277	Lower Plate
117	MCL-408	Clutch Spring	167	SP-561	#10-32 x 3/8 Rd. Hd. Mach. Scr.
118	SP-2665	1/8 x 1/8 x 5/8 Key	168	SP-2706	3/16 x 1 Roll Pin
119	SP-202	1/4-20 x 1/2 Soc. lid. Set Scr.	169	MCL-251	Back Gear Shaft
120	SP-7114	Grease Fitting	170	MCL-260-R	Lower Shifter Gear-20 Teeth,
*	414-01-406-5010	Shaft Assembly, consisting of:			R. H. Including:
121	SP-2732	5/32 x 1" Roll Pin	171	DDL-253	1/4-28 x 3/16 Soc. Hd. Set Scr.
122	414-01-019-5010	Cam	172	LTA-462	3/4 Fiber Washer
123	414-01-106-5041	Shaft	173	MCL-240	Bushing
124	414-03-047-5001	Shifter Arm Shoe	175	SP-201	5/16-18 x 5/16 Soc. Hd. Set Scr.
125	SP-1756	3/8 Ext. Tooth Lockwasher	176	SCG-88	Plug
126	SP-1005	3/8-16 Hex. lam Nut	177	MCL-247	Collar Nut
127	MCL-573	3/8-16 Spec. Sq. Hd. Set Screw	178	MCL-244	Rear Bearing Seal
128	MCL-263	Shaft	179	MCL-237	Spacer
129	MCL-317	Key	180	SP-3306	#8-32 x 3/8 Soc. Hd. Cap Scr.
130	MCL-408	Clutch Spring	181	MCL-267	Key
131	SP-202	1/4-20 x 1/2 Soc. Hd. Set Screw	182	MCL-202	Front Bearing Gasket
132	MCL-214	Sliding Gear Arm	183	MCL-238	Grease Seal Washer
135	MCL-77	Headstock Cover	184	MCL-245	Front Bearing Seal
136	SP-725	1/4-20 x 1 Fil Hd. Screw	185	SP-3309	1/4-20 x 5/8 Soc. Hd. Cap Scr.
137	SP-701	1/4-20 x 3/4 Fil Hd. Screw	186	MCL-424	#2 M T. Adapter
140	SP-612	1/4-20 x 5/8 Hex. Hd. Cap Scr.	186	MCL-428	#3 M. T. Adapter
141	DDL-256	17/64 x 11/16 x 5/64 Steel Washer	190	414-01-l01-5003	Wrench (For L-00 Tapered
142	SP-7011	Retaining Ring			Spindle Nose)
143	MCL-261	Upper Shifter Gear - 20 Teeth, R. H.	191	SP-3306	#8-32 x 3/8 Soc. Hd. Cap Scr.
144	SP-7018	Retaining Ring	192	MCL-434	Key (For L-00 Tapered Spindle Nose)
145	MCL-559	Shaft	193	414-01-079-5001	Nut (For L-O0 Tapered Spindle Nose)
146	SP-2665	1/8 x 1/8 x 5/8 Key	194	SP-7417	Retaining Rang (For L-00 Tapered Spindle
147	DDL-161	1/2 x 7/8 x 1/32 Fiber Washer			Nose)
148	SP-1764	1/4 Int. Tooth Lockwasher	195	960-02-012-0050	Nameplate
149	SP-701	1/4-20 x 3/4 FIL Hd. Screw	196	SP-2250	Drive Screw
150	414-01-037-5005	Instruction Plate	*	Cat #25-542	600 Soft Center (#2 M. T.)
151	SP-2252	#2 x 3/16 Drive Screw	*	Car. #25-640	7" Drive Plate(For 2 1/4-8
152	SP-2719	1/8 x 1 Roll Pin			Threaded Spindle Nose
153	MCL-545-S	Handle, Including:	*	Cat. #25-642	7" Drive Plate (For L-00 Tapered
154	SP-755	1/4-20 x 3/4 Soc. Hd. Screw			Spindle Nose)
155	MCL-547	Pin	*	Not Shown	
156	SP-2729	3/16 x 1/2 Roll Pin			
157	MCL-546	Plate			



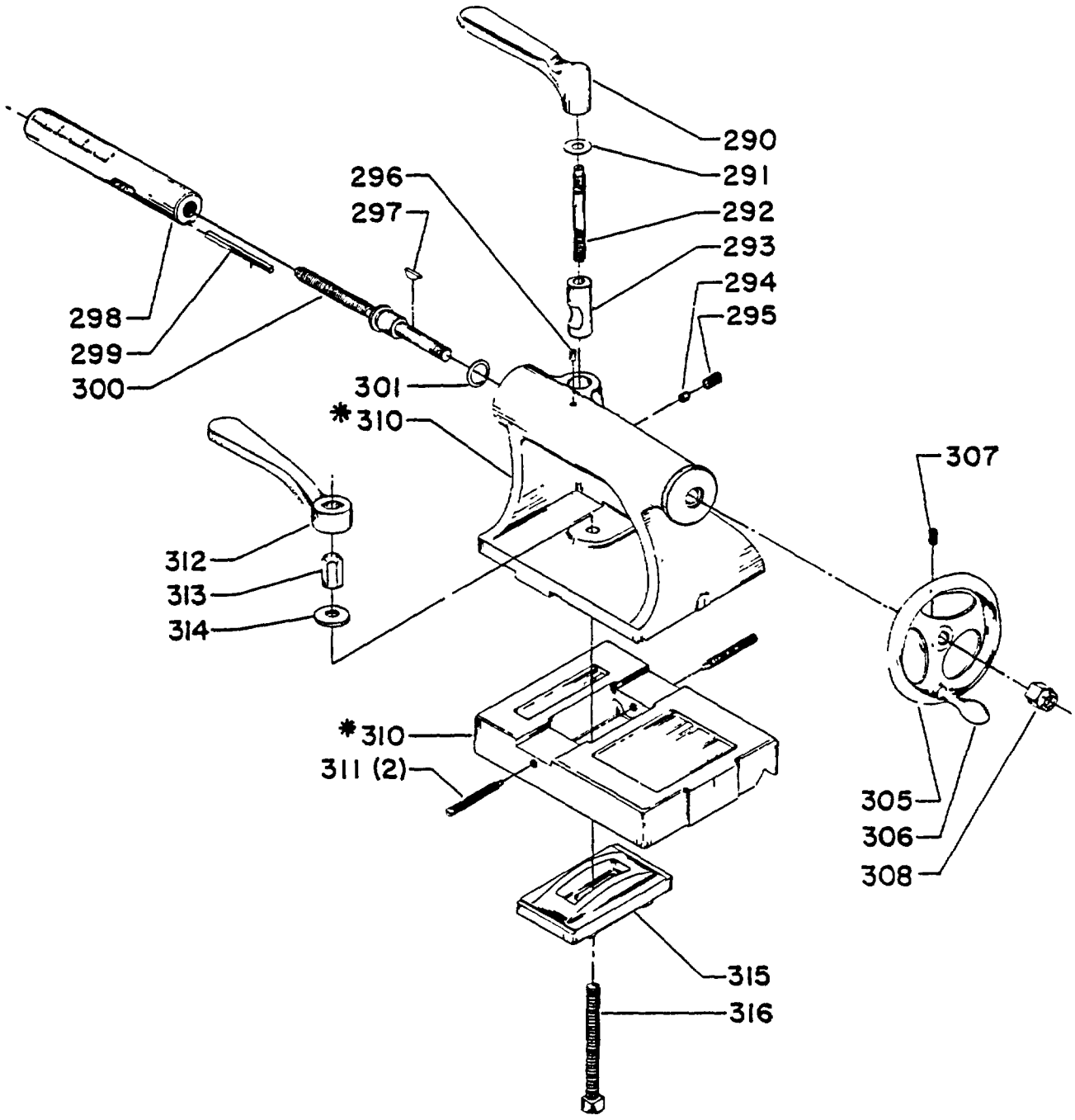
* REPLACEMENT BEARINGS ARE FURNISHED UNDERSIZE AND MUST BE REAMED TO FIT AFTER INSTALLATION.

QUICK CHANGE GEAR BOX

Figure C

QUICK CHANGE GEAR BOX (Figure C)

R No.	Part No.	Description	Ref. No.	Part NO.	Description
210	SP-725	1/4-20 x 1 Fil Hd. Cap Scr.	242	MCL-190	Gear - 18 Teeth
211	SP-649	5/16-18 x 1 Hex. Hd. Cap Scr.	243	MCL-191	Gear - 20 Teeth
*	MCL-704-S	Quick Change Gear Box Complete, consisting of:	244	MCL-192	Gear - 22 Teeth
			245	MCL-193	Gear - 20 Teeth
212	MCL-704-A	Quick Change Gear Box, Including:	246	MCL-194	Gear - 24 Teeth
213	414-01-017-5012	Bearing	247	MCL-195	Gear - 26 Teeth
214	MCL-383	Bearing	248	MCL-403	Gear - 27 Teeth
215	MCL-384	Bearing	249	MCL-196	Gear - 28 Teeth
216	414-01-017-5013	Bearing	250	MCL-187-S	Key with Pin
217	414-01-017-5011	Bearing	251	MCL-186	Shaft
218	MCL-385	Bearing	255	SP-7017	Retaining Ring
219	MCL-382	Bearing	256	MCL-201	Spacer
220	SP-2617	Key	251	MCL-271	Left Hand Shifter Gear - 26 Teeth
221	MCL-185	Shaft	258	MCL-217-S	Key with Pin
222	MCL-179-S	Compound Drive Gear	259	MCL-404	Right Hand Shifter Gear - 26 Teeth
223	MCL-178-S	Compound Idler Gear, Including;	260	SP-1005	3/8-16 Hex. Jam Nut
224	920-75-511-8053	Bearing	261	MCL-204	Index Pin
225	MCL-248	Collar	262	MCL-205	Spring
226	SP-1300	5/16-18 Hex. Nut	263	931-01-022-0490	Knob
227	SP-1300	5/16-18 Hex. Nut	264	MCL-311	Bearing
228	MCL-248	Collar	265	MCL-200	Idler Gear - 40 Teeth
229	MCL-197	Gear - 24 Teeth	266	904-01-031-7706	380 x 1 x. 0598 Steel Washer
230	MCL-414	Spacer	267	MCL-207	Left Hand Shifter Lever
231	SP-5099	Oiler	268	MCL-199	Left Hand Idler Screw
232	SCG-74-S	Oiler	269	MCL-203	Right Hand Shifter Lever
233	SP-2617	Key	270	MCL-188	Right Hand Idler Screw
234	MCL-401	Shaft	271	MCL-270	Shaft
236	MCL-184-S	Gear - 16 Teeth, Including:	272	SP-7008	Retaining Ring
237	920-75-511-7158	Bearing	273	SDP-34-S	Set Collar, Including:
238	MCL-178-S	Compound Idler Gear, Including:	274	SP-208	1/4-20 x 1/4 Soc. Hd. Set Screw
239	920-76-511-8053	Bearing	279	SP-2252	#2 x 3/16 Drive Screw
240	MCL-189-S	Gear - 16 Teeth, Including:	280	414-01-072-5004	Instruction Plate
241	SP-208	1/4-20 x 1 1/4 Soc. Hd. Set Scr.	*	Not Shown	



TAILSTOCK

*** TAILSTOCK AND SUB-BASE MUST BE PURCHASED UNDER MCL-68-B AS A UNIT. WHEN REPLACING, ALIGN HEADSTOCK AND TAILSTOCK AND SCRIBE WITNESS MARKS.**

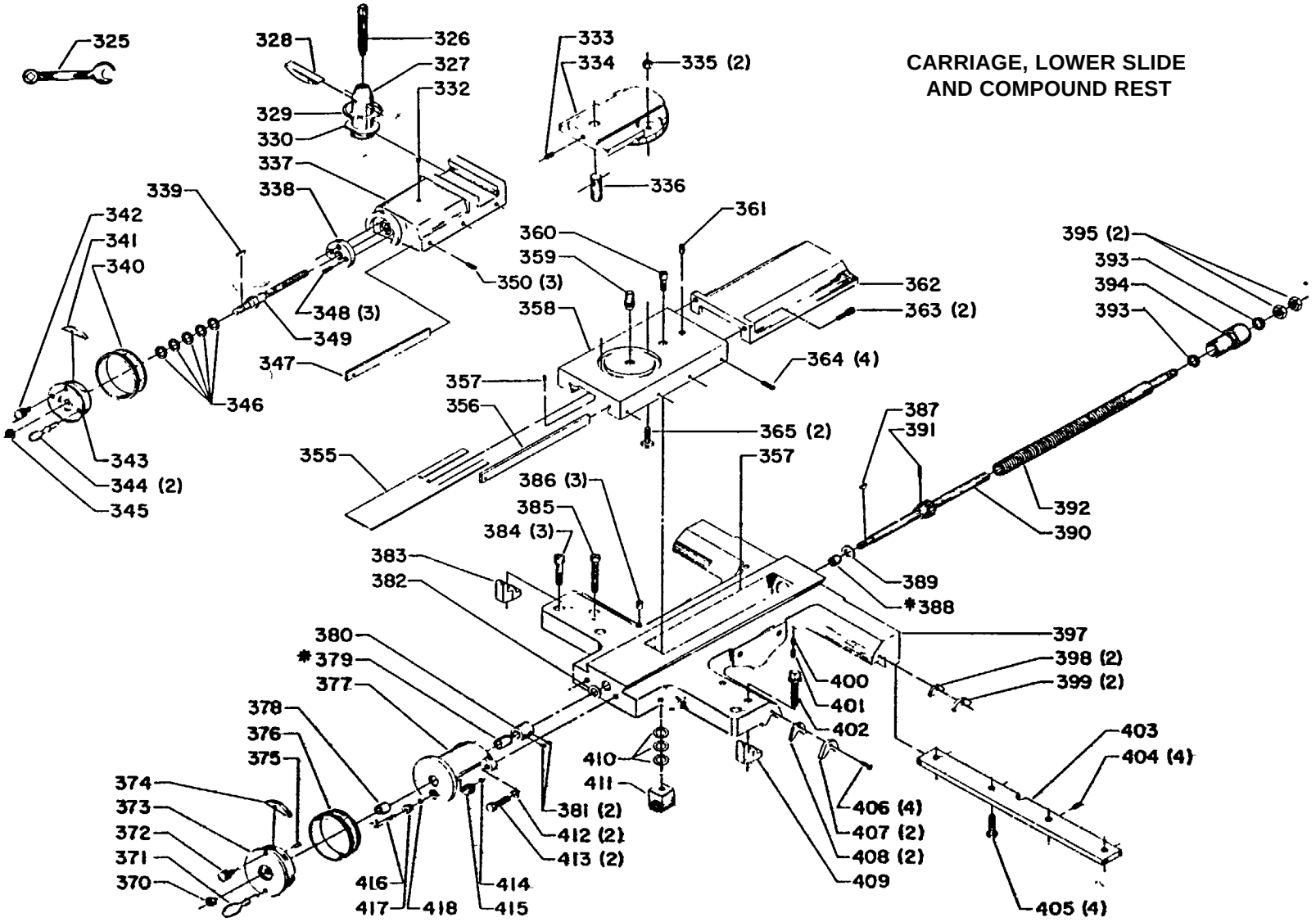
Figure D

TAILSTOCK (Figure D)

Ref. No.	Part NO.	Description
290	MCL-108	Handle Wrench
291	SP-1638	15/32 x 59/64 x. 065" Steel Washer
292	MCL-116	Stud
293	MCL-117	Clamp Sleeve
294	SCG-246	Plug
295	SP-242	3/8-16 x 1/2 Hex. Soc. Set Screw
296	SP-2486	Oiler
297	SP-2617	Key
298	414-01-078-5005	Ram
299	MCL-472-S	Tailstock Ram Key
300	414-01-112-5026	Adjusting Screw
301	MCL-113	Thrust Washer
305	930-01-991-6368	Handwheel Including:
306	SP-3601	Handle
307	SP-231	5/16-18 x 3/8 Soc. Hd. Set Scr.
308	902-01-211-7282	1/2-20 Stop Nut
310	MCL-68-B	Tailstock and Sub-Base, Including:
311	CBL-423	5/16-18 x 2 1/2 Adjusting Screw
312	Cat #942	25/32 Hex. Box Wrench
313	CBL-422	Spec. Acorn Nut
314	CBL-426	Spec. Washer
315	MCL-70	Clamp
316	SP-2374	1/2-13 x 4 Sq. Hd. Bolt
*	Cat #25-541	60° Hard Center(3M.T.)

* Not Shown

CARRIAGE, LOWER SLIDE AND COMPOUND REST



* REPLACEMENT BEARINGS ARE FURNISHED UNDERSIZE AND MUST BE REAMED TO FIT AFTER INSTALLATION.

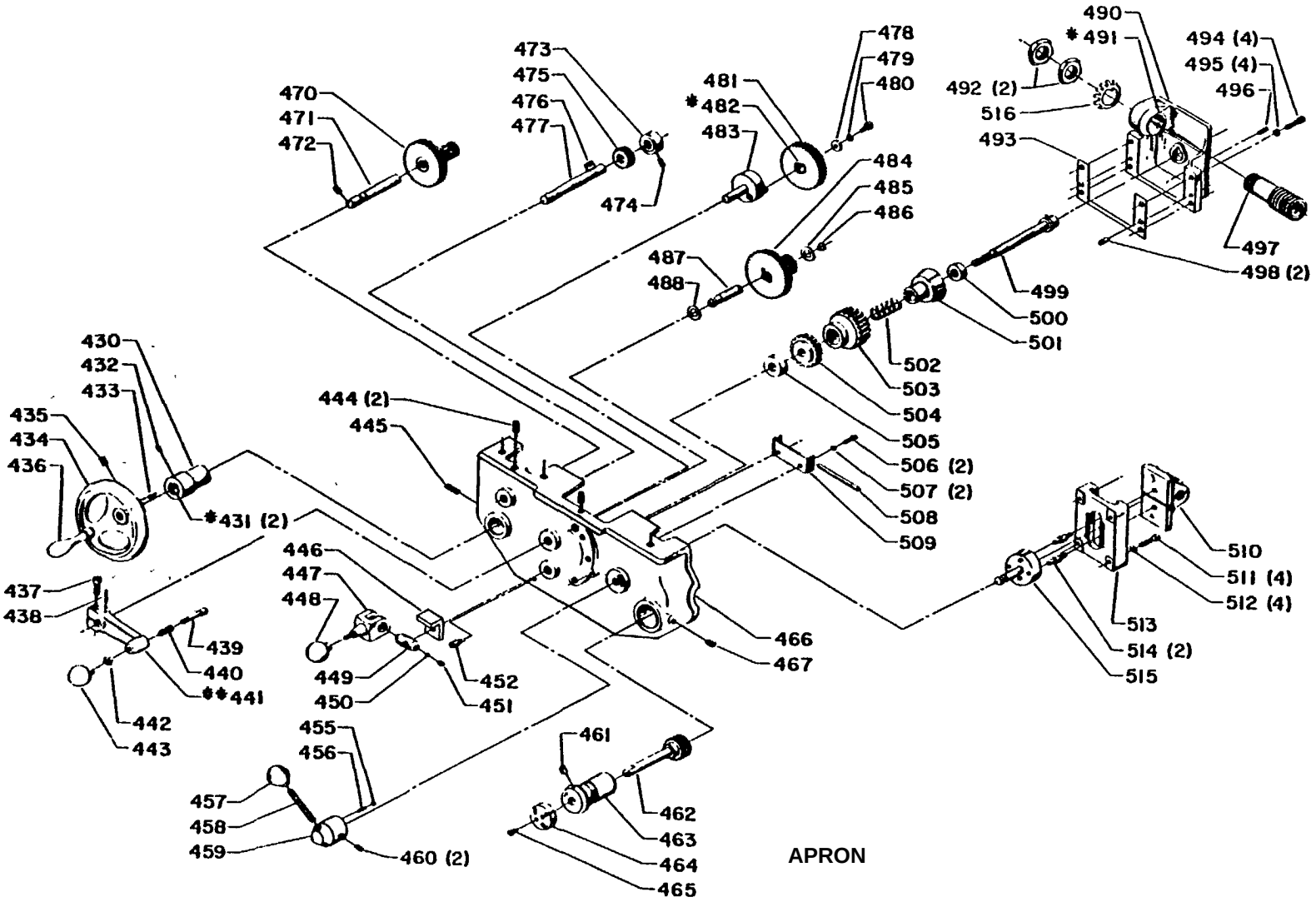
Figure E

CARRIAGE, LOWER SLIDE AND COMPOUND REST (Figure E)

R No.	Part No.	Description
325	MCL-309	Wrench
326	DDL-236	Tool Pet Screw
327	MCL-591	Tool Post
328	DDL-238	Adjusting Gib
329	MCL-592	Tool Past Washer
330	DDL-235	Swivel Washer
332	SP-7103	Oiler
333	SP-203	1/4-20 x 3/8 Soc. Hd. Set Scr.
334	MCL-63	Swivel Saddle
335	DDL-255	5/16-18 Hex. Jam Nut
336	MCL-595	Upper Slide Peed Nut
337	MCL-594	Compound Slide
338	MCL-585	Stop Collar
339	SP-218	Key
340	MCL-584	Graduated Collar
341	MCL-582	Locking Wedge
342	MCL-576	Lock Screw
343	MCL-593-A	Handwheel Including:
344	SP-3602	Handle
345	SP-1081	3/8-24 Hex. Lock Nut
346	41401429-5008	Set of Shims (1/2 x 3/4 x. 001, .002, .003, .004, and .005 Thk.)
347	MCL-94	Upper Slide Gib
348	SP-3306	#8-32 x 3/8 Soc. Hd. Cap Scr.
349	MCL-596	Upper Slide Feed Screw
350	901-04-140-9445	1/4-20 x 1/2 Soc. Hd. Set Scr.
355	MCL-308	Way Cover
395	MCL-88	Lower Slide Gib
357	SP-2722	1/16 1/4 Roll Pin
358	MCL-61-S	Lower Slide, Including:
359	DDL-248	Steel Pin
360	SP-3350	5/16-18 x 1/2 Soc. Hd. Cap Scr.
361	SP-5118	Oiler
362	MCL-62	Lower Slide Extension Cover
363	SP-3309	1/4-20 x 5/8 Soc. Hd. Cap Scr.
364	901-04-140-9446	1/4-20 x 3/4 Soc. Hd. Set Scr.
365	MCL-561	Swivel Saddle "T" Bolt
370	SP-1081	3/8-24 Hex. Lock Nut
371	SP-3603	Handle
372	MCL-578	Lock Screw
373	MCL-515	Handwheel
374	MCL-577	Locking Wedge
375	SP-6711	1/8 x 3/8 Roll Pin
376	MCL-80	Micrometer Collar
377	MCL-65-A	Lower Feed Screw Flange. Including:
378	MCL-106	Bushing
379	MCL-83	Bearing
380	MCL-532-S	Set Collar Including:
381	SP-246	#10-32 x 3/16 Soc Hd. Set Screw
382	MCL-5M3	33/84 x 7/8 x. 062 Steel Washer
383	MCL-98	Clamp Block
384	SP-784	3 /8-16 x 1 1/4 Soc Hd. Cap Scr.
385	SP-799	3/8-16 x 1 3/4 Fil Hd. Cap Scr.
386	SP-5118	Oiler
387	SP-2618	Key
388	MCL-538	1/2 x 5/8 x 23/64 Bushing
389	MCL-533	33/64 x7/ 8 x .062 Steel Water
	414-01-412-5014	Lower Peed Shaft Assembly. Consisting of:
390	MCL-446-S	Lower Feed Shift
391	SP-2704	1/8 x 3/4 Roll Pin
392	MCL-794-S	Lower Peed Screw
393	MCL-328	29/64 x 47/64 x 3/32 Feed Screw Washer
394	MCL-583	Bushing
395	SP-1233	7/16-20 Hex. Jam Nut
397	MCL-60	Saddle
398	414-03-113-5002	Rear Wiper
399	MCL-101	Rear Wiper Retainer
400	SP-1148	1/4-20 x 9/8 Soc. Hd. Set Scr.
401	SP-203	1/4-20 x 3/8 Soc. Hd. Set Scr.
402	SP-60E3	3/8-16 x 2 1/4 Sq. Hd. Collar cap Screw
403	MCL-90	Clamp Plan
404	SP-154	#10-32 x 3/8 Headless Set Scr.
405	SP-649	5/16-18 x 1 Hex Hd. Cap Set.
406	SP-3019	#6-32 x 1/2 Rd. Hd. Self-Tapping Screw
407	MCL-99	Front Wiper Retainer
408	414-03-113-5001	Front Wiper
409	MCL-98	Clamp Block
410	414-01-355-5001	Feed Screw Nut Assembly wit Set of shims (9/16 x 7/8 x .002. .003, and .004 thk), Including:
411	MCL-720	Peed Screw Nut
412	SP-1703	5/16 Lockwasher
413	SP-608	5/16-18 x 7/8 Hex. Hd. Cap Scr.
414	SP-7043	Retaining Ring
415	MCL-465	Thumb Knob
416	MCL-461-S	Index cam
417	MCL-464	Nut for Index Cam
418	SP-3651	"O" Ring
		Not Shown

APRON (Figure F)

R No.	Part No.	Description	Ref. No.	Part NO.	Description
430	MCL-131-S	Sleeve. Including:	475	MCL-132	Gear (18 Teeth) for Handwheel
431	MCL-386	Bearing	476	SP-2617	Key
432	SP-7103	Oiler	477	MCL-130	Shaft for Handwheel
439	SP-2617	Key	478	DDL-256	17/64 x 11/16 x .078 Steel Washer
434	931-01-991-6868	Handwheel, Including:	479	5P-1702	1/4 Lockwasher
435	SP-231	5/16-18 x 3/8 Soc. Hd. Set Scr.	480	SP-601	1/4-20 x 3/8 Hex. Hd. Cap Scr.
436	SP-3601	Handle	481	MCL-139-S	Eccentric Gear, Including:
437	SP-769	1/4-28 x 3/4 Soc Hd. Cap Scr.	482	MCL-405	Bearing
438	SP-2719	1/8 x I Roll Pin	483	MCL-140-S	Eccentric Assembly
439	MCL-148	Indexing Pin	484	MCL-144-S	Compound Gear
440	MCL-406	Spring for Eccentric	485	DDL-161	1/2 x 7/8 x 1/32 Fiber Washer
441	MCL-146	Eccentric Handle	488	SP-018	Retaining Ring
442	SP-9152	1/4-20 Hex. Jam Nut	487	MCL-142	Shaft for Compound Gear
443	931-01-022-0490	Knob	488	DDL-161	1/2 x 1/8 x 1/32 Fiber Washer
444	SP-217	5/16-18 ax 1/2 Soc. Hd. Set Scr.	490	MCL-167-A	Worm Gear Cover, Including
445	SP-225	5/16-18 x 1/4 Soc. Hd. Set Scr.	491	MCL-407	Bushing
446	MCL-536	Bracket	492	TCS-217	1 1/8-20 Hex. Lock Nut
447	MCL-159	Clutch Handle	493	MCL-747	Gasket
448	931-01-022-0490	Knob	494	SP-710	1/4-20 x 7/8 Fil Hd. Screw
449	MCL-160	Swivel Pin for Clutch	495	SP-1702	1/4 Lockwasher
450	MCL-161	3/16 x 1/8 Brass Plug	496	SP-293	1/4-20 x 5/8 Soc. Hd. Set Scr.
451	SP-208	1/4-20 x 1/4 Soc. Hd. Set Scr.	497	MCL-168-6	Worm Gear
452	SP-5214	Oiler	498	SP-2702	1/4 x 5/8 Roll Pin
455	SP-28	1/4 Dia. Steel Ball	499	MCL-163-S	Shaft
456	DDL-123	Coil Spring	500	SP-5323	Bearing
457	931-01-022-0490	Knob	501	MCL-165	Clutch
458	MCL-151	Stud	502	MCL-158	Clutch Spring
459	MCL-152	Hub	503	MCL-166	Worm Wheel - 36 Teeth
460	SP-254	5/16-24 x 3/8 Soc. Hd. Set Scr,	504	MCL-164	Transmission Gear - 28 Teeth
461	SP-7103	Oiler	505	SP-5322	Bearing
462	MCL-171-S	Shaft and Gear	506	SP-3322	#10-24 x 1/4 Soc. Hd. Cap Scr.
463	MCL-173	Timing Gear Sleeve	507	SP-1775	#10 Int. Tooth Lockwasher
464	MCL-170	Dial	508	MCL-150	1/4" Dia. Lock Pin
465	SP-561	#10-32 x 3/8 Rd Hd. 5.	509	MCL-149	Lock Pin Guide Plate
466	MCL-72	Apron	510	MCL-156	Half-Nut (Furnished in Pairs)
467	SP-231	5/16-18 x 3/8 Soc. Hd. Set Scr.	511	SP-614	1/4-20 x 1 1/4 Hex. Hd. Cap Scr.
470	MCL-137-S	Compound Gear	512	SP-1702	1/4 lockwasher
471	MCL-136	Rack Pinion Shaft	513	MCL-155	Half-Nut Shoe
472	SP-7103	Oiler	514	MCL-154	Spec. Screw
473	MCL-133	Collar for Handwheel	515	MCL-153	Cm for Half-Nut
474	901-04-150-6215	1/4-20 x 3/8 Soc. Hd. Set Scr.	516	247-6	Lockwasher

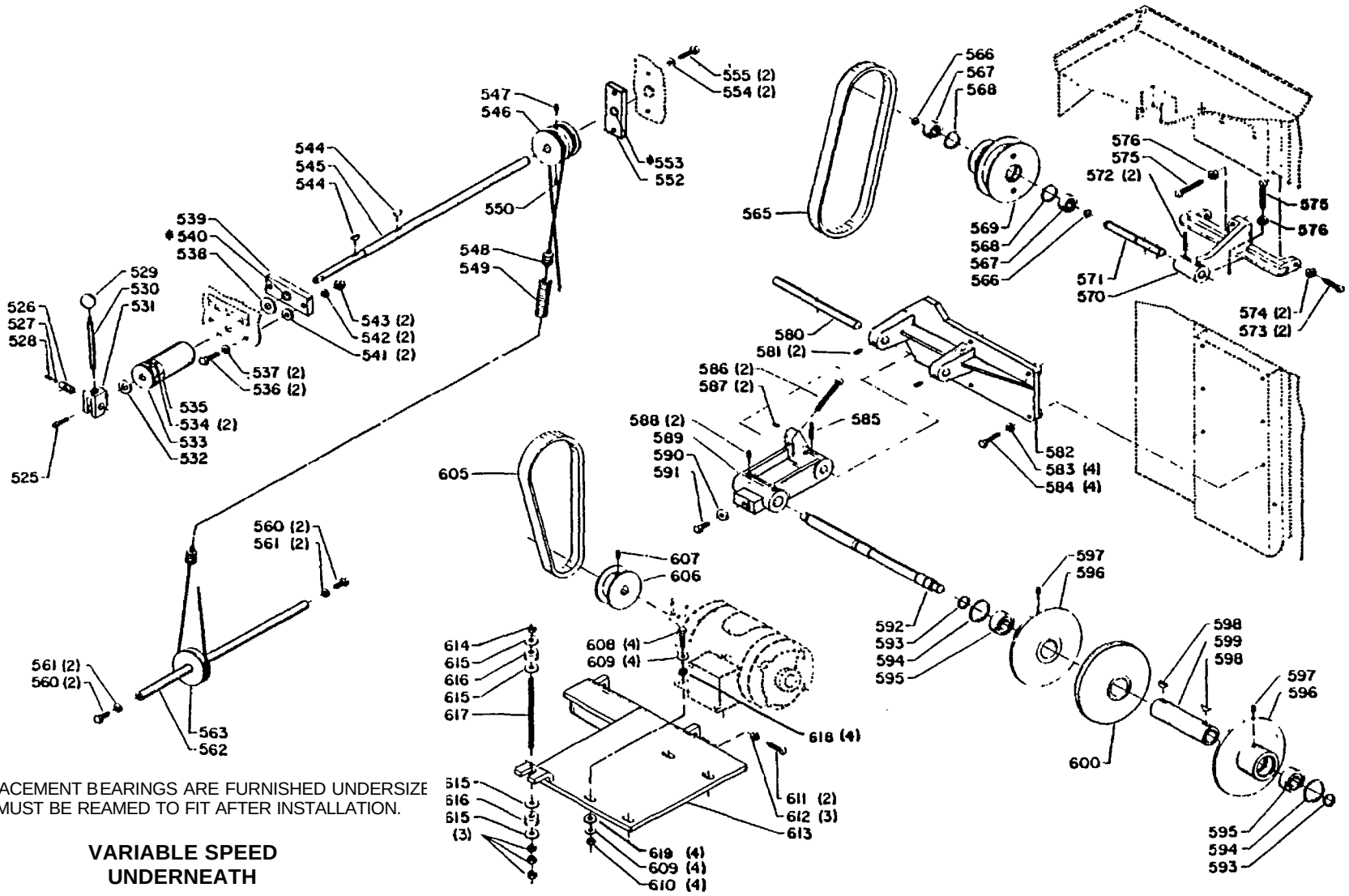


* REPLACEMENT BEARINGS ARE FURNISHED UNDERSIZE AND MUST BE REAMED TO FIT AFTER INSTALLATION.

** HOLE FOR ROLL PIN IS PARTIALLY DRILLED IN HANDLE. FINISH DRILL WHEN REPLACING.

Figure F

WHEN ORDERING PARTS, SPECIFY CATALOG NO. 25-117



* REPLACEMENT BEARINGS ARE FURNISHED UNDERSIZE AND MUST BE REAMED TO FIT AFTER INSTALLATION.

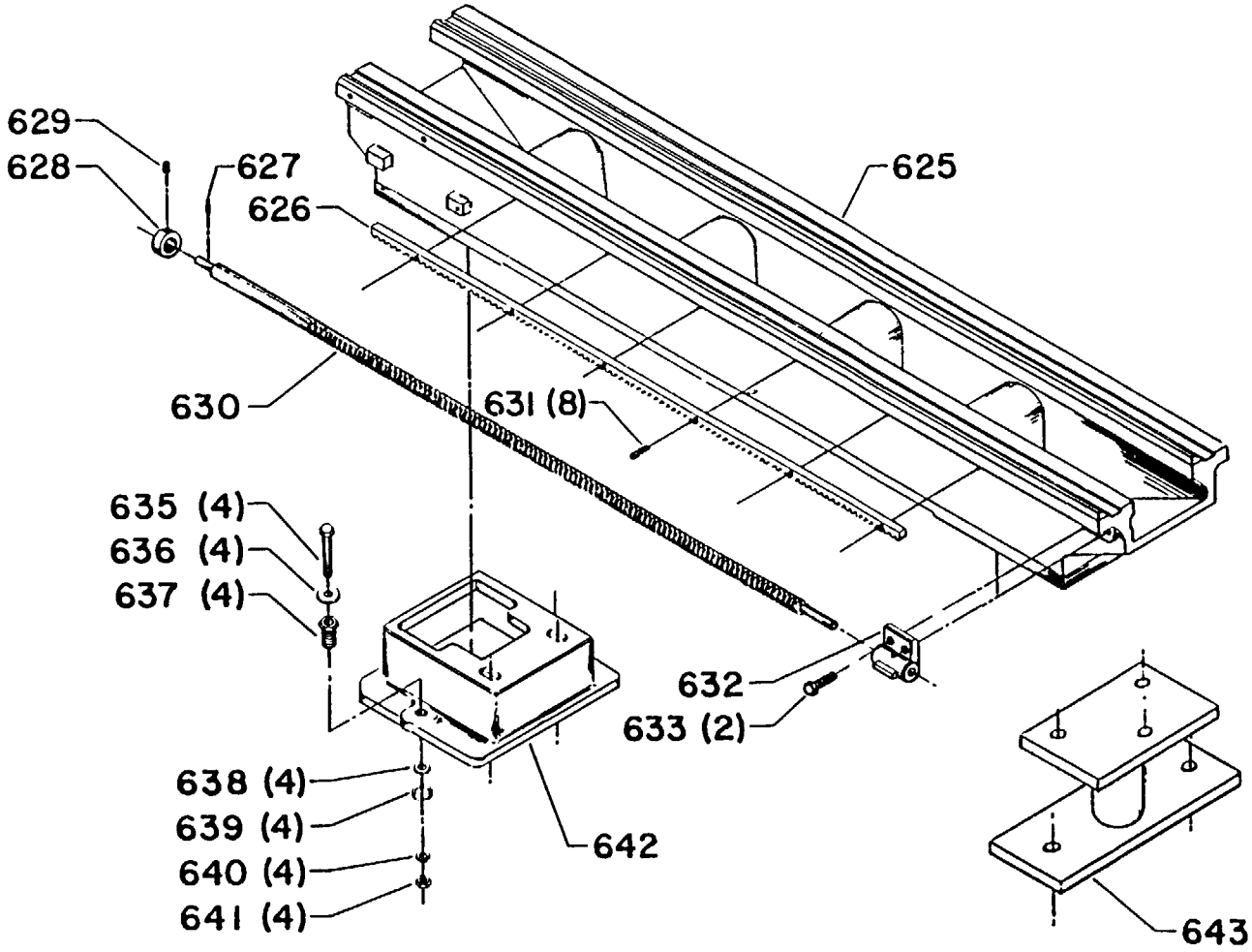
VARIABLE SPEED UNDERNEATH

Figure G

VARIABLE SPEED DRIVE (Figure G)

Ref. No.	Part NO.	Description
525	901-01-020-3803	5/16-18 x 1 Fil Hd. Scr.
526	414-02-071-5018	Swivel Pin for Cam Block
527	MCL-161	3/18 dia. x 1/8 lg. Brass Plug
528	SP-202	1/4-20 x 1/2 Hex. Soc. Set Scr.
529	931-01-022-0490	Handle Ball
530	434-04-111-5001	Stud for Cam Lever (Threaded both ends)
531	434-04-019-5001	Cam Block
532	414-02-068-5001	Special Washer
533	414-01-107-5003	Hub for Speed Control Shaft
534	901-06-110-3031	#4-40 x 1/4 Rd. Hd. Self-Tapping Screw
535	414-01-037-5010	Speed Control Dial
536	SP-644	3/8-16 x 1 1/4 Hex. Hd. Cap Scr.
537	240-117	3/8 x 3/4 x 1/32 Washer
538	SP-1608	5/8 x 1 1/2 x 3/32 Washer
539	414-02-304-5001	Bearing Block, Including:
540	MH-3023	Sleeve Bearing
541	240-104	3/8 x 1 x 3/16 Washer
542	SP-1704	3/8 Lockwasher
543	SP-5900	3/8-16 Hex, Nut
544	SP-2601	3/16 x 3/4 Woodruff Key
545	414-01-106-5037	Speed Control Shaft
546	414-02-100-5001	Speed Control Regulating Pulley
547	SP-213	5/16-18 x 1/2 Hex Soc. Set Scr.
548	414-01-381-5001	Cable Assembly
549	928-02-081-8876	Tension Spring
550	SP-231	5/16-18 x 3/8 Hex. Soc set Scr.
552	414-01-304-5003	Bearing Block. Including:
553	MH-3023	Sleeve Bearing
554	240-117	3/8 x 3/4 x 1/32 Washer
555	SP-648	3/8-16 x 1 1/4 Hex. Hd. Cap Scr.
560	SP-640	3/8-16 x 3/4 Hex. Hd. Cap Scr.
561	240-117	3/8 x 3/4 x 1/32 Washer
562	414-02-106-5022	Idler Pulley Shaft
563	414-01-362-5001	Idler Pulley W/Sleeve Bearing
565	Cat. #25-500	Variable Speed Belt - Upper
*	414-01-314-5006	Jack Shaft Bracket Assy Consisting of:
566	SP-7411	Retaining Ring - External
567	SP-5335	Ball Bearing
568	904-15-101-7147	Retaining Ring - Internal
569	926-03-131-9352	Jack Shaft Pulley
570	414-01-314-5007	Jack Shaft Bracket, Including:
571	414-01-106.5038	Jack Shaft
572	SP-5070	1/4 x 1 1/2 Roll Pin
573	SP-337	3/8-16 x 1 1/2 Sq. Hd. Set Scr.
574	SP-5433	3/8-16 Hex. Jam Nut
575	SP-324	3/8-16 x 2 Sq. Hd. Set Screw
576	SP-5433	3/8-16 Hex. Jam Nut
580	414-02-106-5025	Pivot Shaft
581	SP-217	5/16-18 x 1/2 Hex Soc. Set $r.
582	414-01-014-5019	Mounting Bracket
583	240-64	3/8 x 3/4 x 3/32 Washer
584	SP-609	5/16-18 x 1 1/2 Hex. Hd, Cap Scr.
585	SP-5077	5/16 x 1 1/4 Roll Pin
586	SP-316	3/8-16 x 3 Sq. Hd. Set Sea.
587	SP-208	1/4-20 x 1/4 Hex Soc Set Scr.
588	SP-217	5/16-18 x 1/2 Hex. Soc. Set Sc.
589	414-01-014-5021	Variable Speed Pulley Bracket
590	240-104	375 x 1 x 3/16 Washer
591	SP-640	3/8-16 x 3/4 Hex. Hd. Cap Scr.
*	926 -05-991-9359	Variable Speed Pulley Complete, Consisting of:
592	414-01-106-5036	Variable Speed Pulley Shaft
593	SP-7025	Retaining Ring - External
594	904-15-100-7021	Retaining Ring - Internal
595	SP-5360	Ball Bearing
596	926-05-061-9358	Pulley
597	901-04-150-6202	5/16-18 x 3/8 Hex. Soc. Set Scr.
598	SP-2604	#606 Hi-Pro Key
599	414-01-105-5015	Sleeve
600	926-05-991-9360	Pulley with Bearing
605	Cat. #25-500	Variable Speed Belt - Lower
606	Cat. #41-913	Motor Pulley (5/81"Bore), Including
607	SP-213	5/16-18 x 1/2 Hex. Soc. Set Scr.
606	Cat. #41-914	Motor Pulley (3/4" Bore), Including:
607	SP-213	5/16-18 x 1/2 Hex Soc. Set Scr.
606	Cat. #41-915	Motor Pulley (7/8" Bore),Including:
607	SP-213	5/16-18 x 1/2 Hex. Soc. Set $cr.
606	Cat. #41-916	Motor Pulley (1" Bore). Including:
607	SP-213	5/16-18 x 1/2 Hex. Soc. Set Scr;
606	Cat. #41-917	Motor Pulley. (1 1/8" Bore). Incl.
607	SP-207	5/16-18 x 1/2" Hex. Soc. Se; Sq.
608	SP-602	5/16-18 x 1 1/4 Hex. Hd. Soc Scr.
609	240-99	21/64 x 7/8 x 1/16 Washer
610	SP-1300	5/16-18 Hex. Nut
611	SP-337	3/8-16 x 1 1/2 Sq. Hd. Set Scr.
612	SP-5433	3/8-16 Hex. Jam Nut
613	414-01-372-5004	Motor Plate
614	SP-5900	3/8-16 Hex. Nut
615	TAS-82	13/32 x 1 1/8 x 1/8 Washer
616	932-01-011-5036	1/2 x 1 1/8 x 1/2 Rubber Bumper ·
617	MCL-7	Motor Mount Support Screw
618	961-03-010-2859	Rubber Grommet
619	904-08-021-3886	Rubber Grommet

* Not shown assembled.



LATHE BED AND RISER BLOCKS

Figure H

LATHE BED (Figure H)

Ref. No.	Part Number	Description
625	MCL-305	4' Lathe Bed
625	MCL-305-H	4' Flame Hardened Ladle Bed
625	MCL-306	5' Lathe Bed
625	MCL-306-H	5' Flame Hardened lathe Bed
626	MCL-390	Gear Rack for 4' Lathe Bed
826	MCL-394	Gear Rack for 5' lathe Bed
627	MCL-511	Shear Pin
628	MCL-626-S	Collar, Including:
829	SP-225	5/16-18 x 1/4 Soc. Hd. Set Scr.
630	MCL-410	24" Lead Screw
630	MCL-412	36" lead Screw
631	SP-3300	910-24 x 5/8 Soc Hd. Cap Scr.
632	MCL-215	Rear Bearing Support
633	SP-649	5/16-18 x 1H . Hd. Cap Screw
635	SP-625	7/16-14 x 2 1/4 Hex. Hd. Cap Scr.
636	SP-1607	1/2 x 1 1/2 x . 083 Steel Washer
637	CBS-84	Spec. 3/4 - 16 Raising Screw
638	MCL-488	15/32 x 55/64 x. 080 Steel Washer
639	SP-9040	7/8 x 1 1/8 x 1/8 “O" Ring
640	SP-1705	1/2 Lockwasher
641	SP-5437	7/16-14 Hex. Nut
642	MCL-218	Riser Block
643	414-01-372-5005	Ball & Socket Riser Block

25-651 MILLING ATTACHMENT

The Delta Milling Attachment has greater versatility by the addition of the pivoted vise (A) Figure 1. The work piece is held between the jaws (B) and (C) and clamped by screws (D).

The vise is rotatably fastened to vertical slide and is marked in degrees on its periphery. The elevating of the vise is accomplished by rotating the hand knob located on top of the main casting and is locked in position by tightening the square head set screw (G). The gib is adjusted by the set screws (H) and locked with the nuts thereon.

The whole attachment is rotatably mounted to the cross slide of the lathe (E) using the same "T" bolts and nuts (F) that hold the lathe compound (which has to be removed). The base is also marked in degrees on its periphery for use in setting up the work piece.

It is suggested that the lead screw and slide ways be kept oiled at all times using the same oil as recommended on the lathe chart or its equivalent.

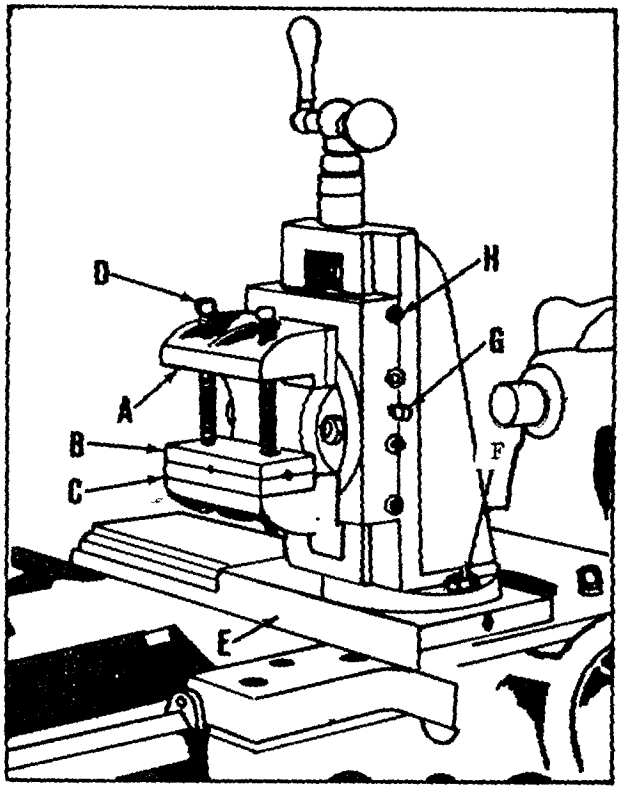
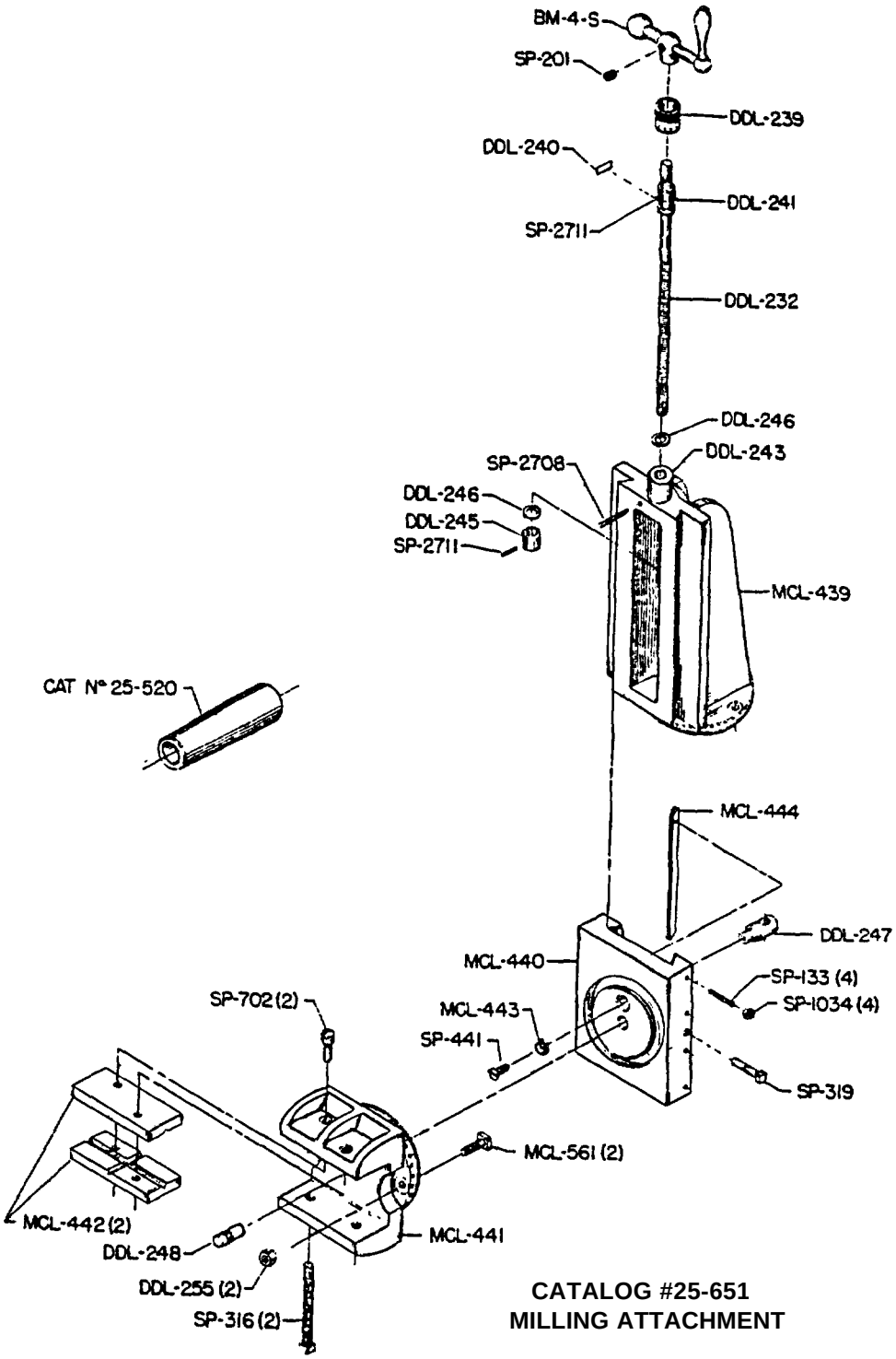


Figure 1

Replacement Parts

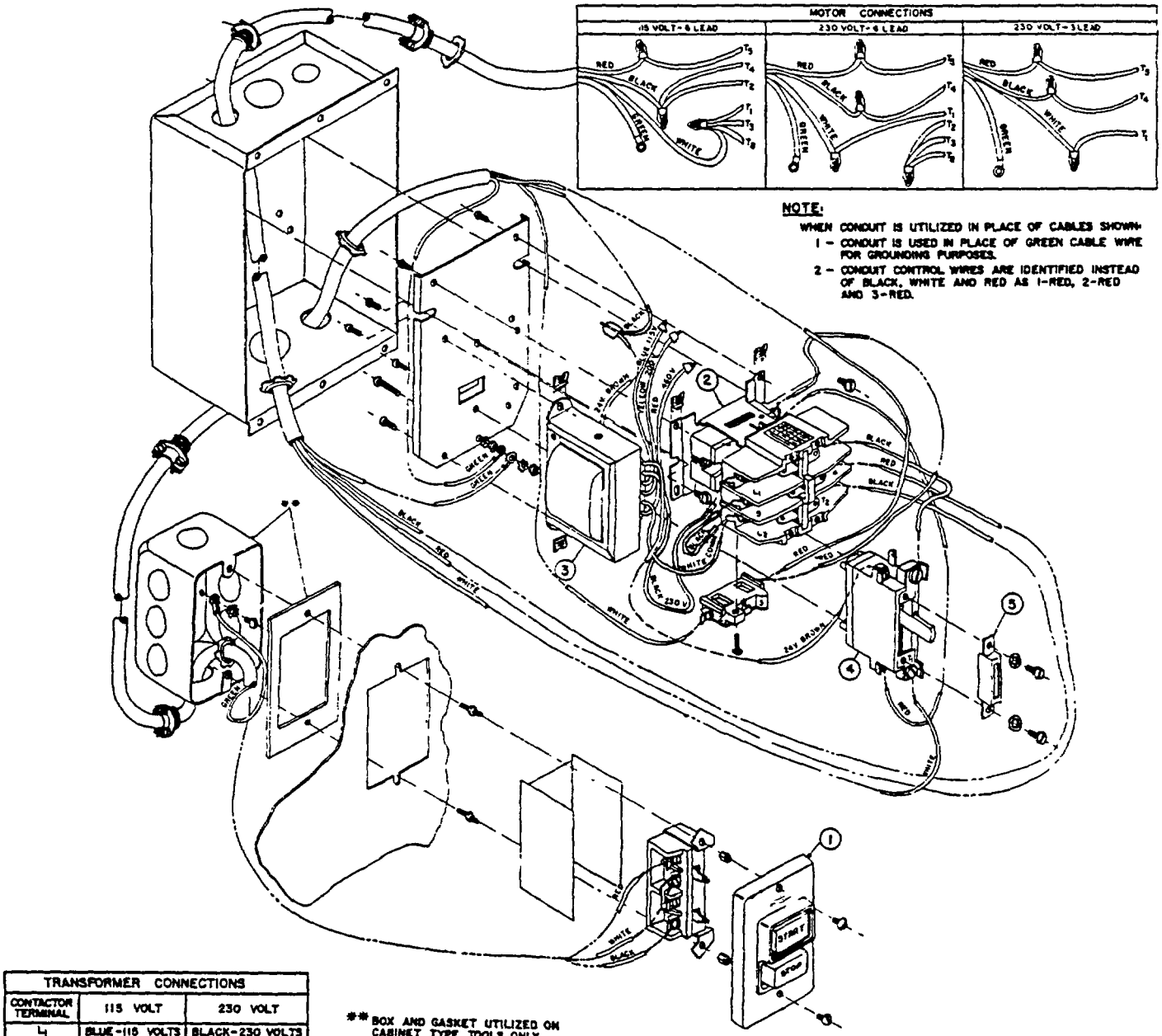
Part No.	Description	Part No.	Description
BM-4-S	Ball Crank Handle, Incl;	MCL-441	Swivel Vise
SP-201	5/16-18 x 5/16" Hex. Set Scr.	MCL-442	Vise Jaw
DDL-Z32	Upper Feed Scr.	MCL-443	Steel Washer
DDL-239	Micrometer Sleeve	MCL-444	Gib for Slide
DDL-240	Fiction Spring	MCL-561	T-Bolt
DDL-241	7/16" x 9/16 Collar	SP-133	1/4-20 Set Scr.
DDL-243	Bushing	SP-316	3/8-16 x 3" Sq. Hd. Set Scr.
DDL-245	7/16 x 1/2" Collar	SP-319	5/16-18 x 1' Sq. Hd. Set Scr.
DDL-246	Fiber Washer	SP-441	1/4-28 x 5/S" Fi Hd. Sac.
DDL-241	7/16-10 L. H. Feed Scr. Nut	SP-7Q2	5/16-18 x 3/4" FIL Hd. Scr.
DDL-248	1/2 x 1" Steel Pin, Knurled one End	SP-1034	1/4"-20 Hex. Nut
DDL-255	5/16-18" Hex Jam Nut	SP-2708	3/16 x 1 1/4" Roll Pin
MCL-439	Body	SP-2711	1/8 x 5/8" Roll Pin
MCL-440	Slide	#25-520	#3 NT. Adapter



CATALOG #25-651
MILLING ATTACHMENT

24 VOLT LVC (LOW VOLTAGE CONTROL)
MAGNETIC MOTOR CONTROL SYSTEMS WIRING DIAGRAMS

NO. 2 24 VOLT SINGLE PHASE MAGNETIC STARTER MOTOR CONTROL SYSTEM

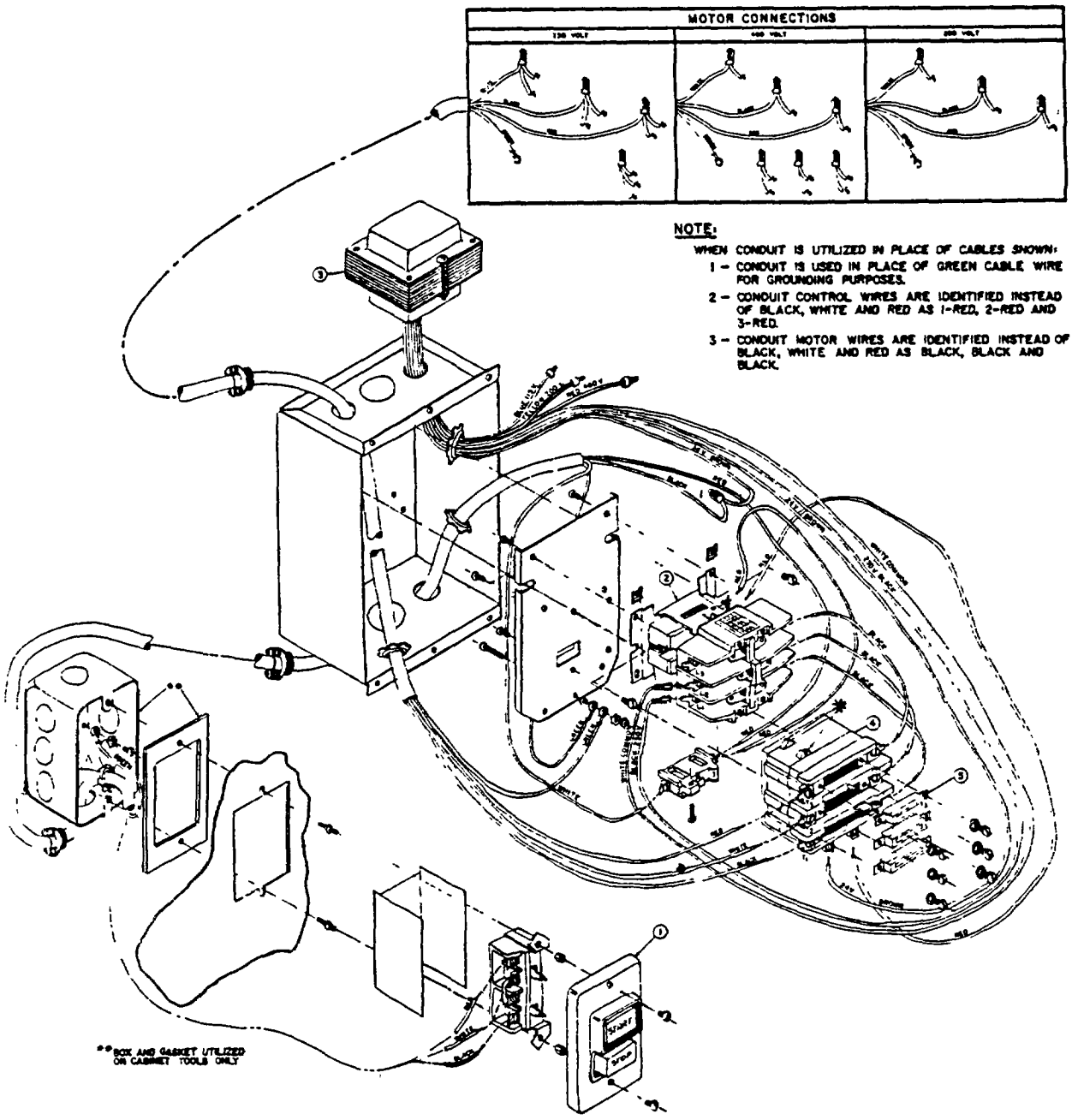


TRANSFORMER CONNECTIONS		
CONTACTOR TERMINAL	115 VOLT	230 VOLT
L1	BLUE-115 VOLTS	BLACK-230 VOLTS
L2	COMMON WHITE	COMMON WHITE

Replacement Parts

1	52-348	Control Station
2	1225237	Contractor
3	1086720	Transformer
4	1225235	Overload Block
5	Specify No.	Heater

NO. 3 24 VOLT THREE PHASE MAGNETIC STARTER MOTOR CONTROL SYSTEM

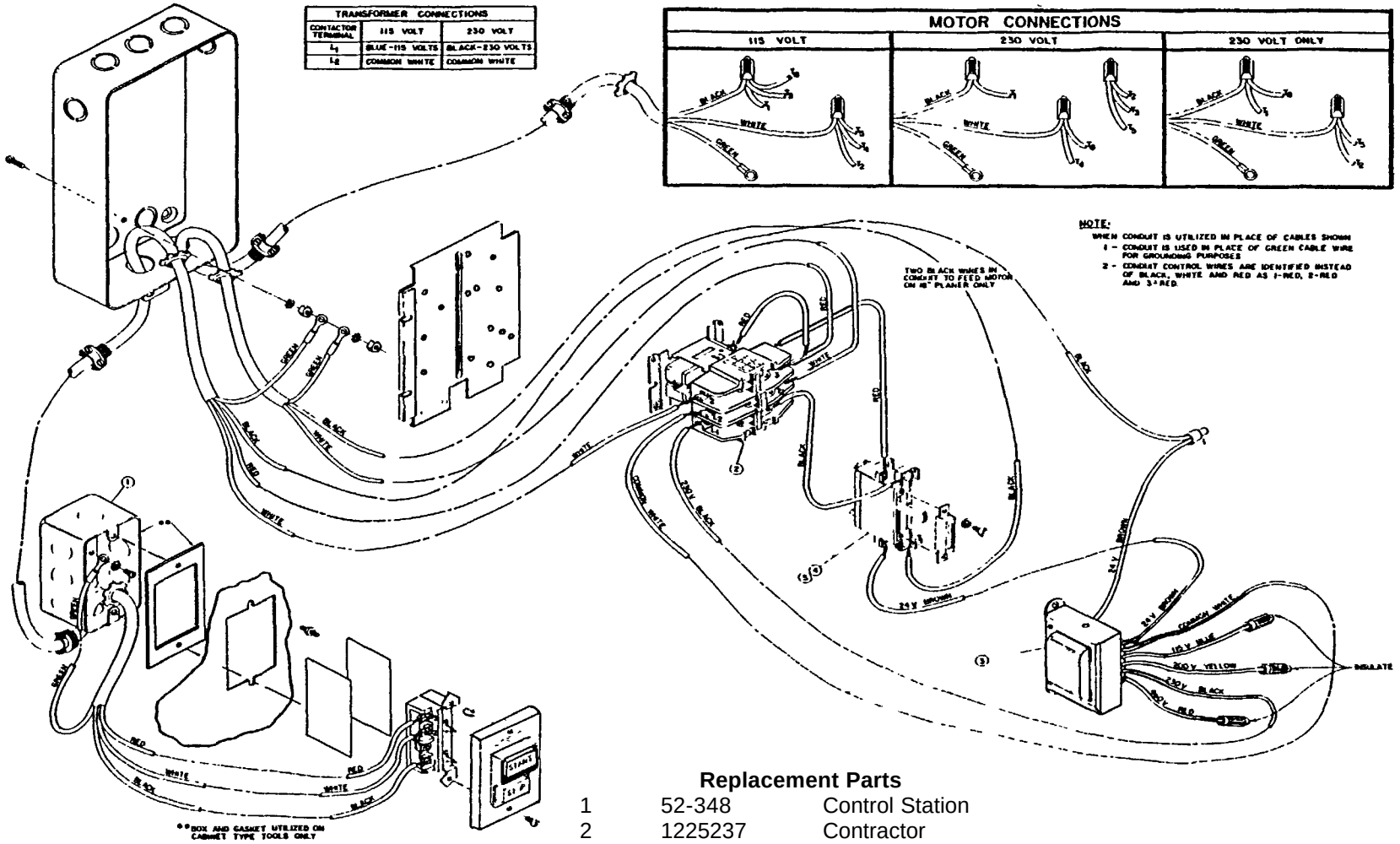


Replacement Parts

1	52-348	Control Station
2	1225237	Contractor
3	1086720	Transformer
4	1225235	Overload Block
5	Specify No.	Heater

TRANSFORMER CONNECTIONS			
CONTACTOR TERMINAL	230 VOLT	460 VOLT	200 VOLT
L_1	BLACK-230 VOLTS	RED-460 VOLTS	YELLOW-200 VOLTS
L_2	COMMON WHITE	COMMON WHITE	COMMON WHITE

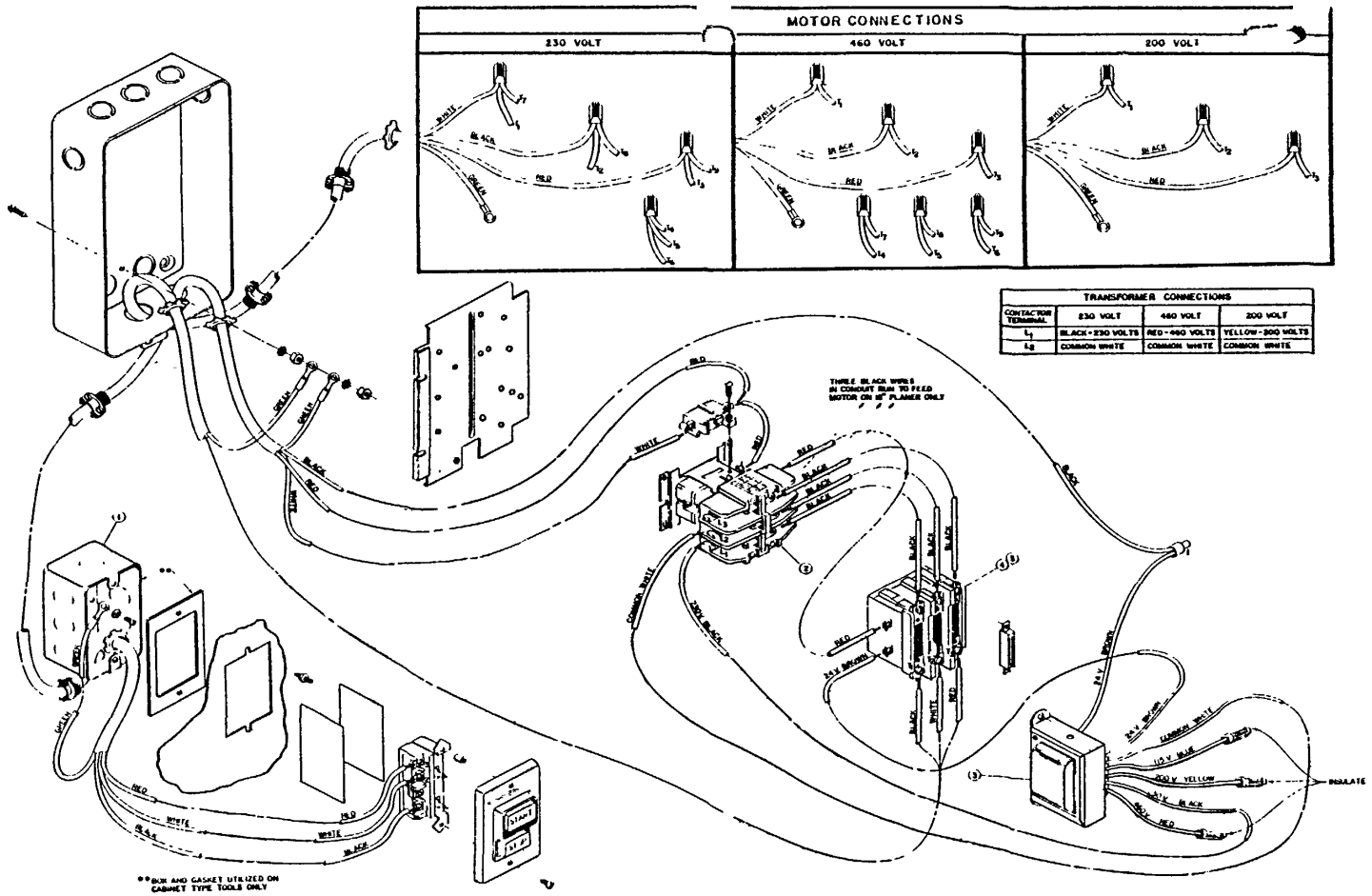
NO. 4 24 VOLT SINGLE PHASE MAGNETIC STARTER MOTOR CONTROL SYSTEM



Replacement Parts

1	52-348	Control Station
2	1225237	Contractor
3	1086720	Transformer
4	1225235	Overload Block
5	Specify No.	Heater

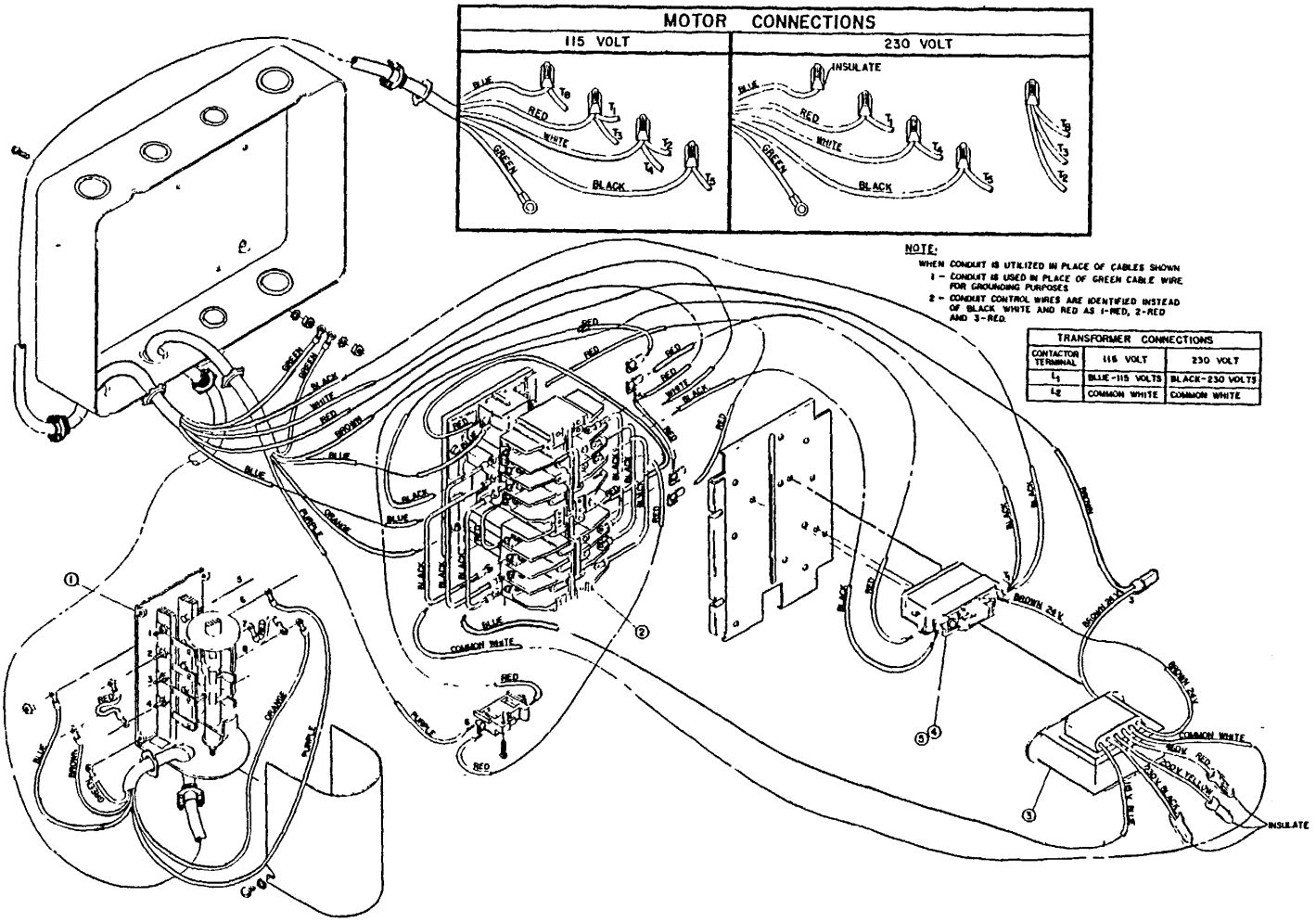
NO. 5 24 VOLT THREE PHASE MAGNETIC STARTER MOTOR CONTROL SYSTEM



Replacement Parts

1	52-348	Control Station
2	1225237	Contractor
a	1086720	Transformer
4	1225235	Overload Block
6	Specify No.	Heater

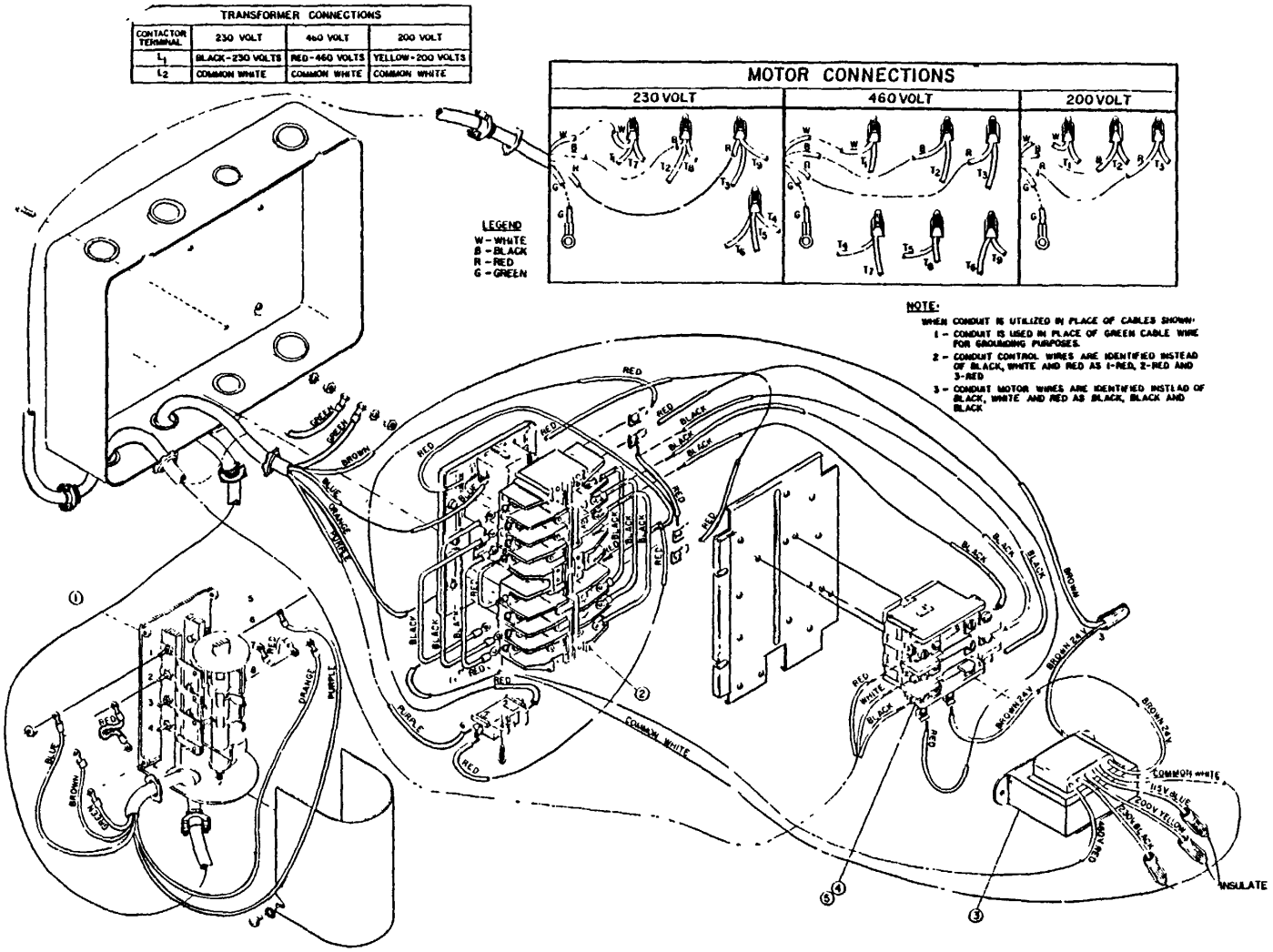
NO. 6 24 VOLT SINGLE PHASE REVERSING MAGNETIC STARTER MOTOR CONTROL SYSTEM



REPLACEMENT PARTS

1.	49-420-for Lathes-49-673 for Mills	
2.	1225278	Contactor
3.	1086720	Transformer
4.	1225250	Overload Block
5.	Specify No.	Heater

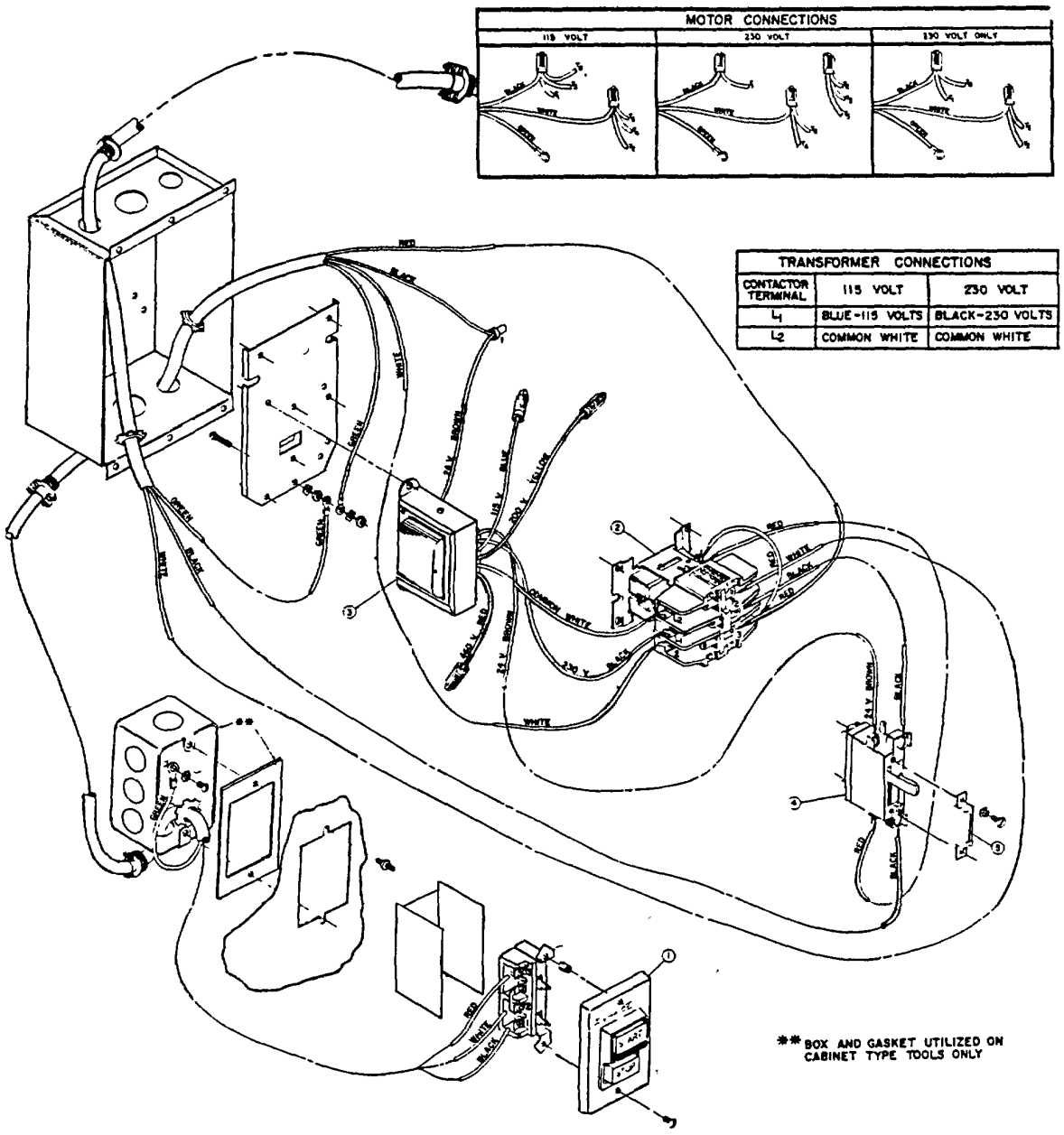
NO. 7 24 VOLT THREE PHASE REVERSING MAGNETIC STARTER MOTOR CONTROL SYSTEM



Replacement Parts

1	49-420-for Lathes-49-673 for Mills	
2	1225278	Concactor
3	1086720	Transformer
4	1226236	Overload Block
6	Specify Mo.	Heater

NO. 8 24 VOLT SINGLE PHASE MAGNETIC STARTER MOTOR CONTROL SYSTEM

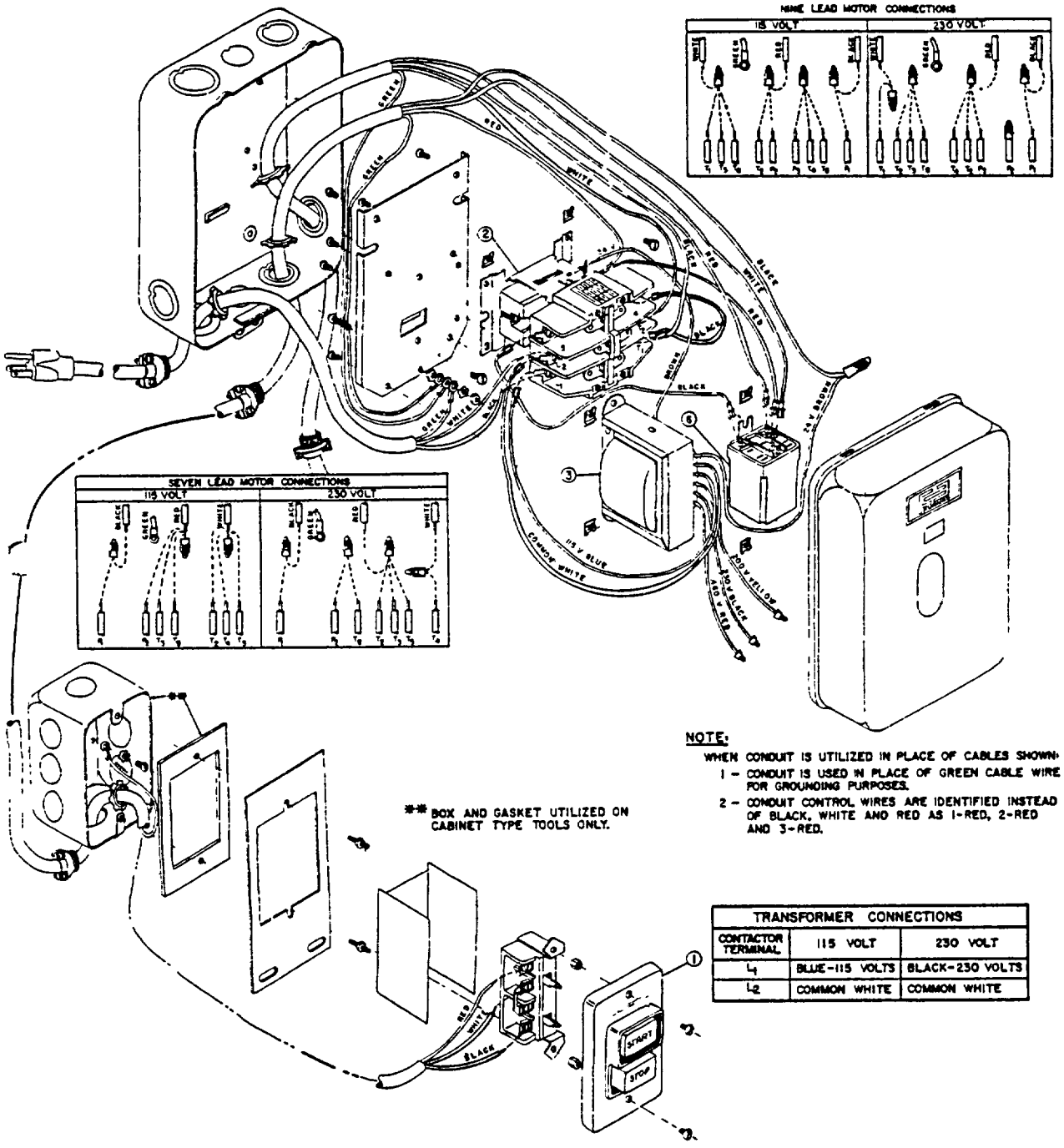


Replacement Parts

1	52-348	Control Station
2	1225237	Contactor
3	1086720	Transformer
4	1225250	Overload Block
5	Specify No.	Heater

NOTE:
WHEN CONDUIT IS UTILIZED IN PLACE OF CABLES SHOWN:
1 - CONDUIT IS USED IN PLACE OF GREEN CABLE WIRE FOR GROUNDING PURPOSES.
2 - CONDUIT CONTROL WIRES ARE IDENTIFIED INSTEAD OF BLACK, WHITE AND RED AS 1-RED, 2-RED AND 3-RED

NO. 9 24 VOLT SINGLE PHASE INTEGRAL MOTOR OVERLOAD PROTECTION MAGNETIC MOTOR CONTROL SYSTEM

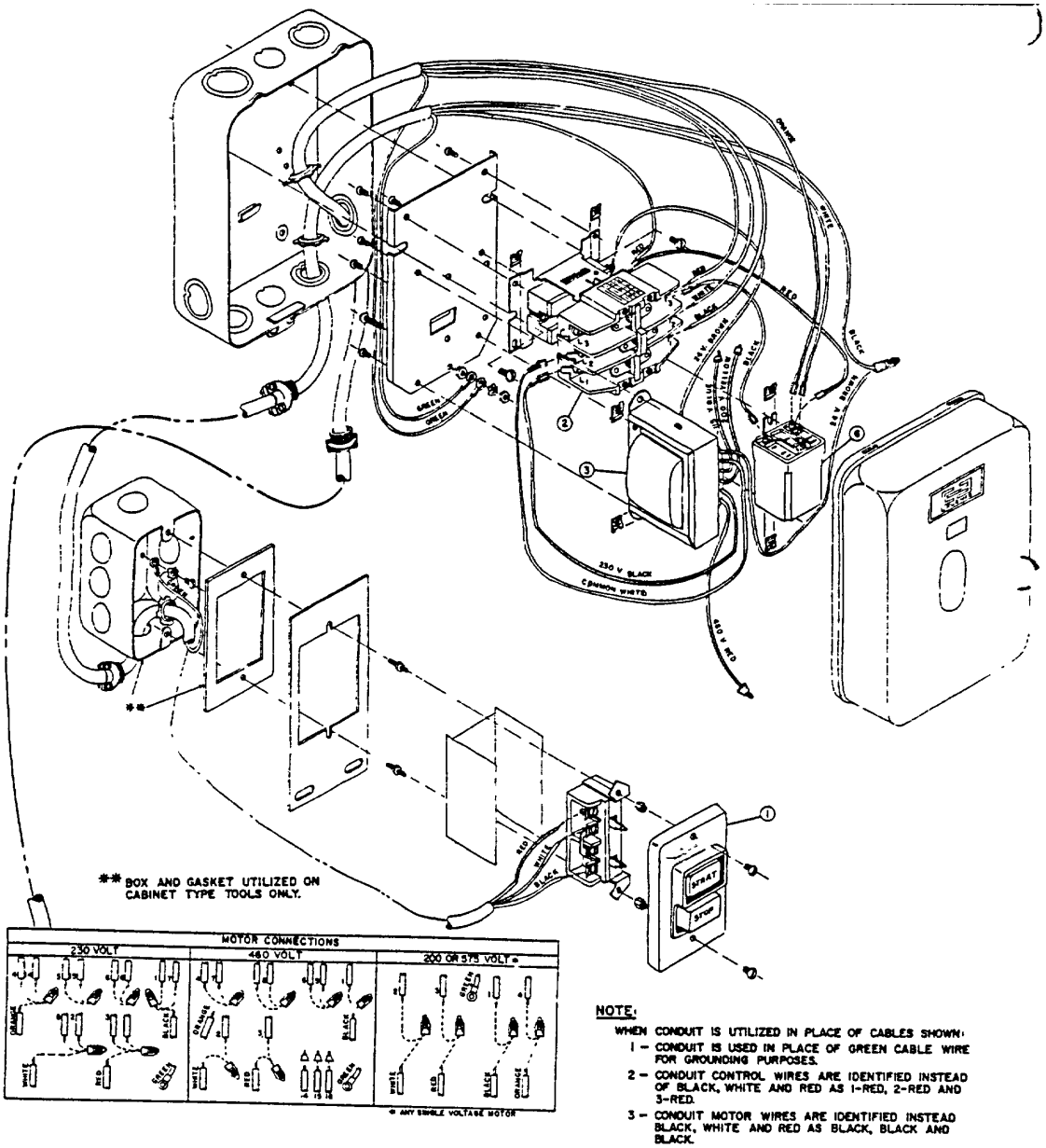


TRANSFORMER CONNECTIONS		
CONTACTOR TERMINAL	115 VOLT	230 VOLT
L1	BLUE-115 VOLTS	BLACK-230 VOLTS
L2	COMMON WHITE	COMMON WHITE

Replacement Parts

1	52-348	Control Station
2	122523I7	Contactor
3	1086720	Transformer
8	1225234	Relay

NO. 10 24 VOLT THREE PHASE INTEGRAL MOTOR OVERLOAD PROTECTION MAGNETIC MOTOR CONTROL SYSTEM

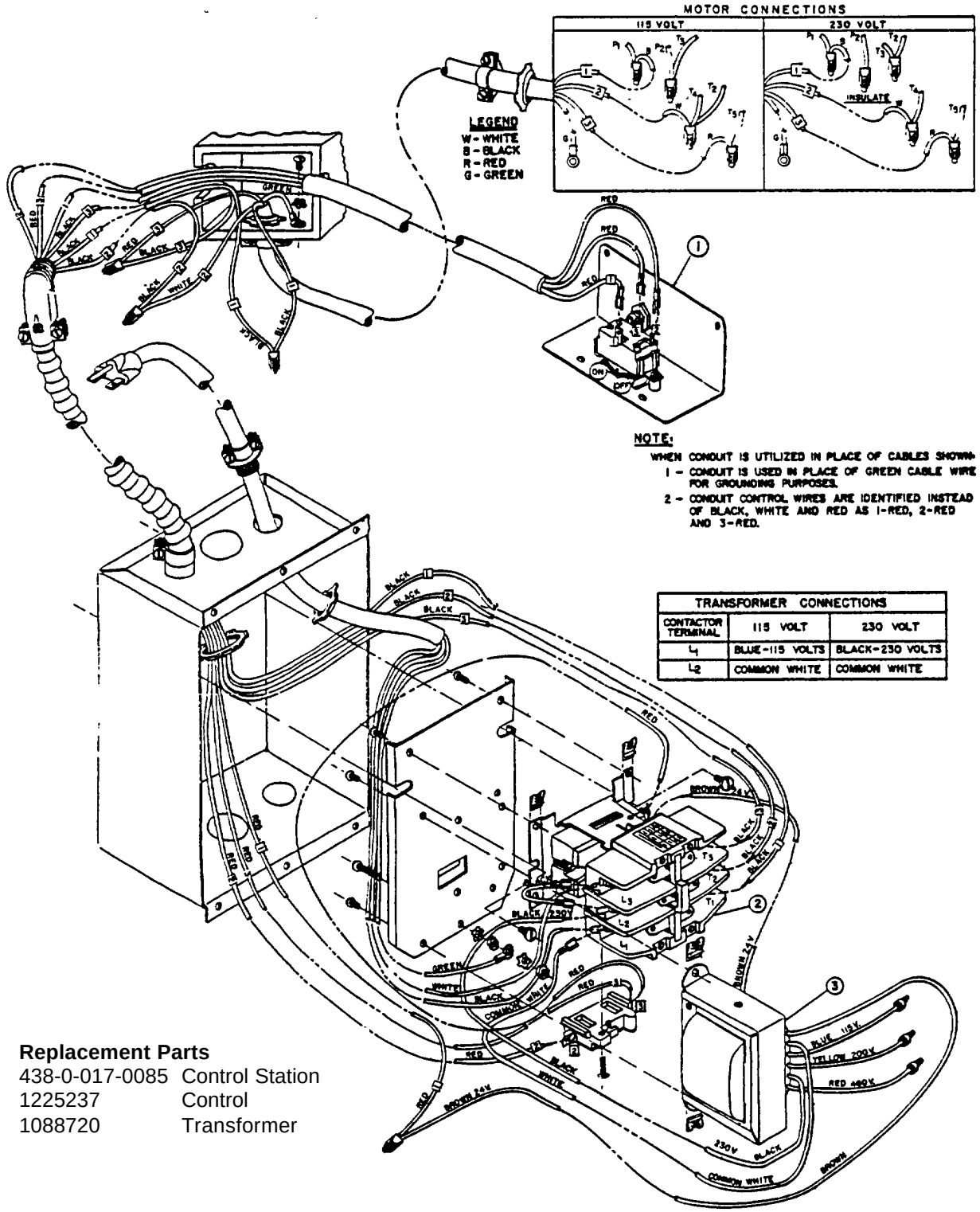


Replacement Parts

1	52-348	Control Station
2	1225237	Contactor
3	1086720	Transformer
6	1225234	Relay

TRANSFORMER CONNECTIONS			
CONTACTOR TERMINAL	230 VOLT	460 VOLT	200 VOLT
L_1	BLACK-230 VOLTS	RED-460 VOLTS	YELLOW-200 VOLTS
L_2	COMMON WHITE	COMMON WHITE	COMMON WHITE

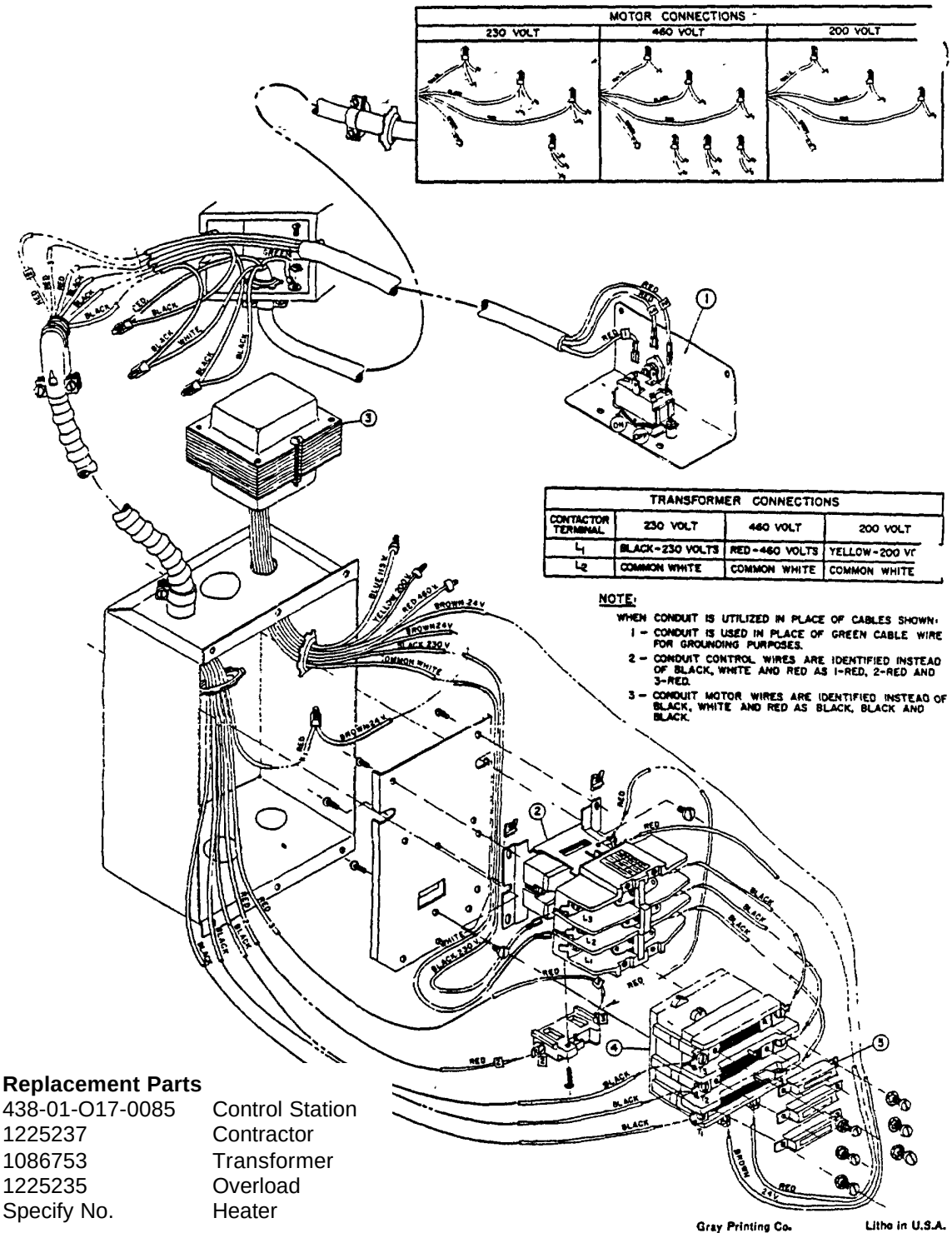
NO. 11 24 VOLT SINGLE PHASE INTEGRAL MOTOR OVERLOAD PROTECTION MAGNETIC MOTOR CONTROL SYSTEM



Replacement Parts

1	438-0-017-0085	Control Station
2	1225237	Control
3	1088720	Transformer

NO. 12 24 VOLT THREE PHASE MAGNETIC STARTER MOTOR CONTROL SYSTEM



Replacement Parts

1	438-01-O17-0085	Control Station
2	1225237	Contractor
3	1086753	Transformer
4	1225235	Overload
5	Specify No.	Heater

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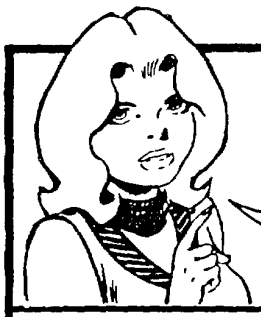

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter=10m Millimeters=0.01 Meters=0.3937 Inches
1 Meter=100 Centimeters=1000 Millimeters=39.37 Inches
1 Kilometer=1000 Meters=0.621 Miles

WEIGHTS

1 Gram=0.001 Kilograms=1000 Milligrams=0.035 Ounces
1 Kilogram=1000 Grams=2.2 Lb
1 Metric Ton=1000 Kilograms=1 Megagram=1.1 Short Tons

LIQUID MEASURE

1 Milliliter=0.001 Liters=0.0338 Fluid Ounces
1 Liter=1000 Millilters=33.82 Fluid Ounces

SQUARE MEASURE

1 Sq Centimeter=100 Sq Millimeters=0.155 Sq Inches
1 Sq Meter=10,000 Sq Centimeters=10.76 Sq Feet
1 Sq Kilometer=1,000,000 Sq Meter=0.0386 Miles

CUBIC MEASURE

1 Cu Centimeter=1000 Cu Millimeters=0.06 Cu Inches
1 Cu Meter=1,000 Cu Centimeters=35.31 Cu Feet

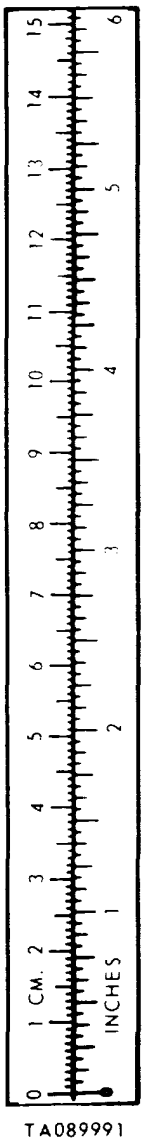
TEMPERATURE

5/9 (°F – 32) = °C
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5 C° +32=F°

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.756
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	5.895
Miles per Gallon	Kilometers per Liters	0.425
Miles per hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.385
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric-Tons	Short Tons	1.102
Newton-Meters	Pound Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621



TA089991

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