

MAY 24 1999

MAINTENANCE MANUAL

SPARE PARTS CATALOG

NUMBER 15

PRECISION DRILLING MACHINES

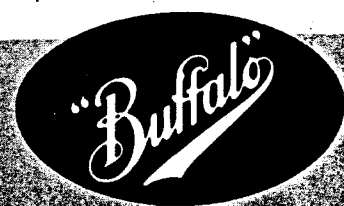
BUFFALO FORGE COMPANY

MACHINE TOOL DIVISION / BUFFALO, N. Y. 14240
CANADIAN BLOWER & FORGE CO., LTD. / KITCHENER, ONTARIO

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No. 4032-C



DRILLING SPEEDS

The following table covers speeds for most materials and in sizes within the capacity of the machine. The ratings are based on the use of "hi-speed" drills. For carbon drills use speeds about one-half those listed.

Size of Drill, Inches	Cast Steel	Alloy- Steel Drop- Forgings	Tool and Carbon- Steel Drop- Forgings	Hard Cast Iron	Malleable Iron	Mild Steel	Cast Iron	Bronze Brass
	Feet per Minute							
	40	50	60	80	90	100	110	200
	Revolutions per Minute							
1/16	2,445	3,056	3,667	4,889	5,500	6,112	6,724	12,224
3/32	1,628	2,038	2,442	3,258	3,666	4,584	5,043	9,168
1/8	1,222	1,528	1,833	2,445	2,750	3,056	3,362	6,112
5/32	976	1,221	1,465	1,954	2,198	2,546	2,802	5,092
3/16	815	1,019	1,222	1,630	1,833	2,036	2,242	4,072
7/32	698	872	1,047	1,396	1,570	1,781	1,962	3,564
1/4	611	764	917	1,222	1,375	1,528	1,681	3,056
9/32	542	678	814	1,084	1,222	1,375	1,513	2,750
5/16	489	611	733	978	1,100	1,222	1,344	2,444
11/32	444	555	666	888	1,000	1,120	1,233	2,290
3/8	407	509	611	815	917	1,018	1,121	2,036
13/32	376	469	563	752	846	946	971	1,892
7/16	349	437	524	698	786	874	921	1,748
15/32	326	407	488	652	732	819	881	1,638
1/2	306	382	458	611	688	764	840	1,528
9/16	271	339	407	543	611	679	747	1,358
5/8	244	306	367	489	550	612	673	1,224

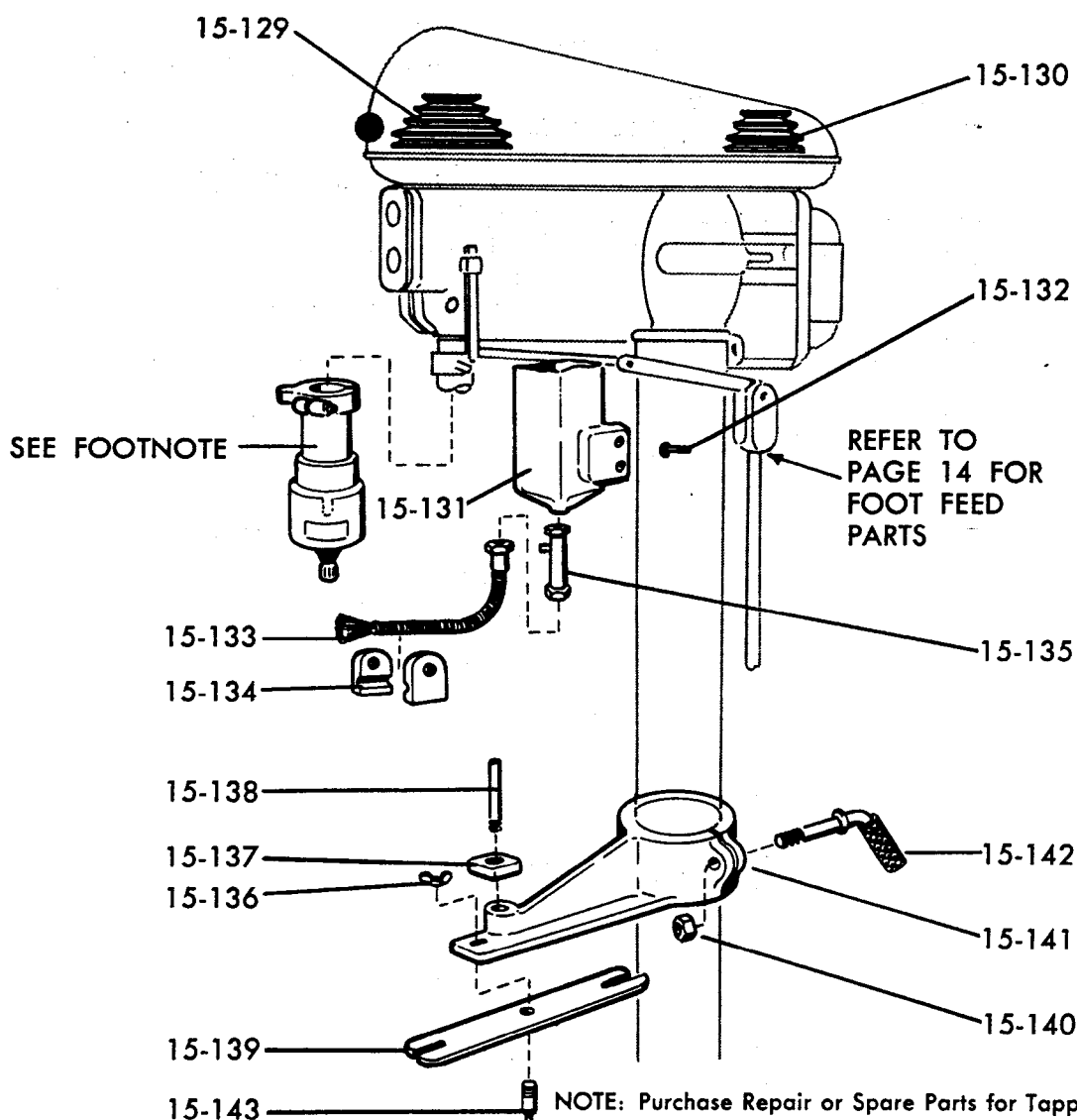
CUTTING OILS

All materials can be drilled dry if care is taken not to force the drill. If a drill starts to smoke when "dry" drilling, it should not be forced further but eased until excess smoking stops. When drilling with lubricant, the smoke arising from the chip is that of the oil and doesn't indicate injury to the drill.

The following cutting oils are suitable under most conditions:

1. Hard Steel.....Turpentine, Kerosene, Soluble oil
2. Soft Steel.....Lard oil, Soluble oil
3. Malleable Iron.....Soluble oil
4. Cast Iron.....Dry—or air jet
5. Brass.....Dry
6. Aluminum.....Kerosene or Soluble oil

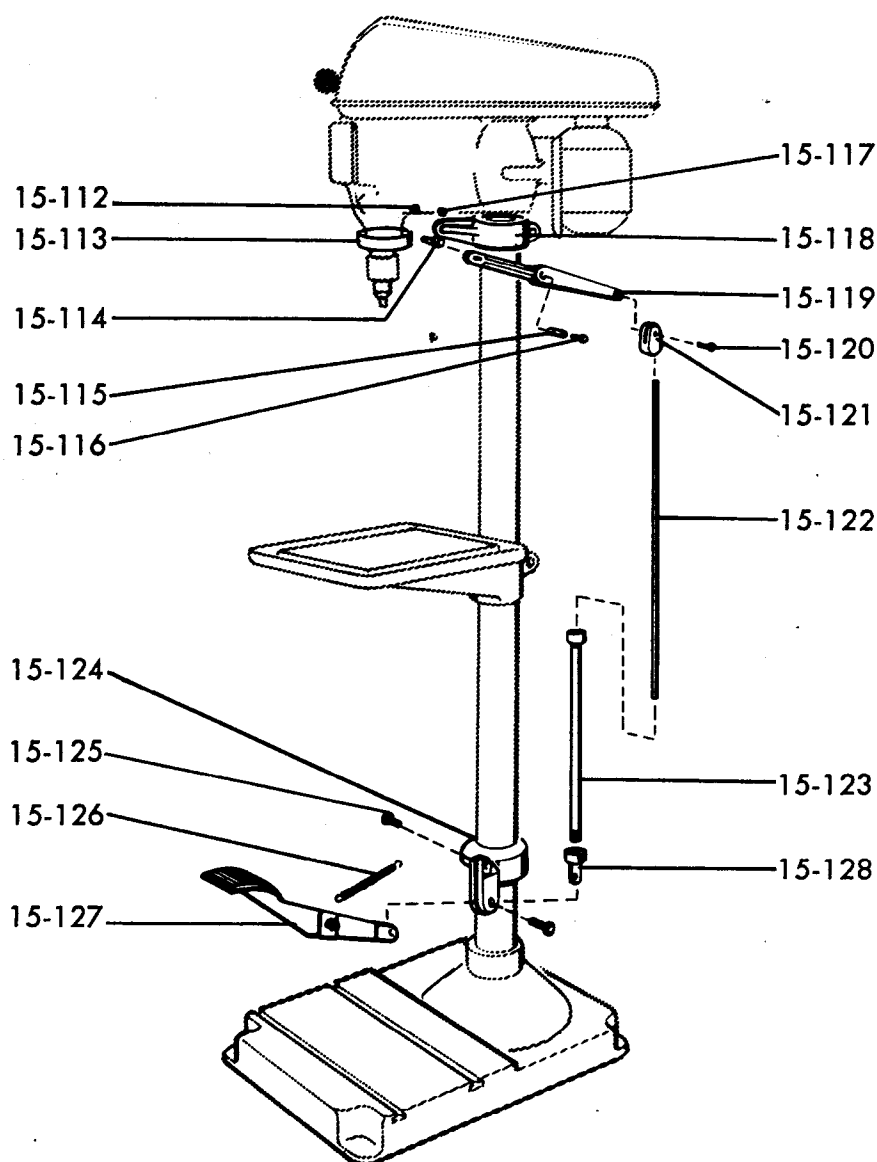
No. 15 TAPPER ASSEMBLY



NO. 15 TAPPING MACHINE PARTS LIST

Part No.	Description	No. Req'd	Remarks
15-129	Spindle Pulley	1	
15-130	Motor Pulley	1	Give Motor Shaft dia.
15-131	Oil Tank	1	
15-132	Hexagon Head Cap Screws, 1/4"-20 x 3/4"	2	
15-133	Oil Tube & Brush	1	
15-134	Oil Tube Clamp	2	
15-135	Sight Feed Oiler	1	
15-136	Wing Nut, 3/8"-16"	1	
15-137	Clamp Collar	1	
15-138	Oil Tube Clamp Post	1	
15-139	Stripper	1	
15-140	Hexagon Nut	1	
15-141	Stripper Bracket	1	
15-142	Clamp Screw	1	
15-143	Stripper Post	1	
15-144	Oil Trough Table	1	Not illustrated

FOOT LEVER FEED ATTACHMENT ASSEMBLY



FOOT LEVER FEED ATTACHMENT PARTS LIST

Part No.	Description	No. Req'd	Remarks
15-112	Hexagon Nut	1	
15-113	Collar	1	
15-114	Screw	1	
15-115	Feed Lever Bushing	1	
15-116	Hexagon Head Cap Screw $\frac{1}{2}$ -20x2 $\frac{3}{4}$ "	1	
15-117	Hexagon Nut $\frac{7}{16}$ x $\frac{7}{8}$	1	
15-118	Feed Lever Bracket	1	
15-119	Spindle Feed Lever	1	
15-120	Rivets $\frac{1}{4}$ x $1\frac{1}{4}$ "	2	
15-121	Yoke for Foot treadle	1	
15-122	Operating Rod	1	
15-123	Operating Pipe	1	
15-124	Treadle Bracket	1	
15-125	Spring Post	1	
15-126	Spring	1	
15-127	Foot Treadle	1	
15-128	Connecting Rod Bearing	1	

TABLE-RAISING SCREW ASSEMBLY

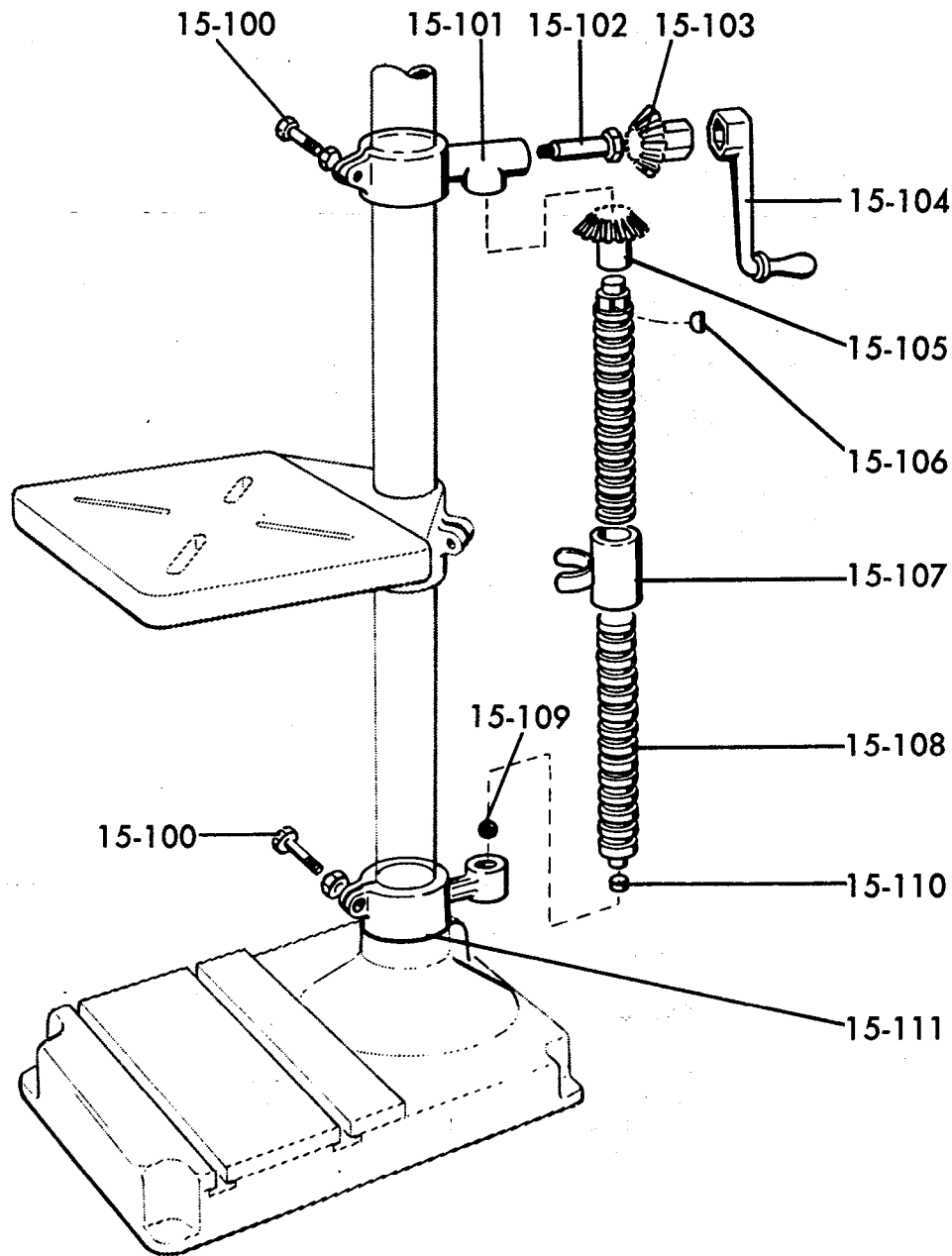
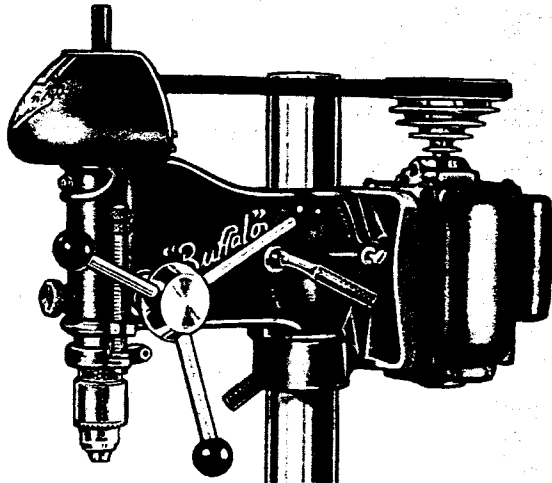


TABLE-RAISING SCREW PARTS LIST

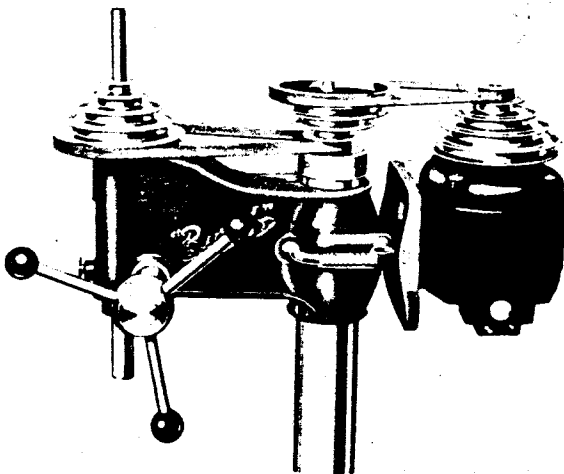
Part No.	Description	No. Req'd	Remarks
15-100	Hexagon Head Cap Screw & Nut, 3/8"-16x1 1/2"	2	
15-101	Support for Screw	1	
15-102	Pin for Pinion	1	
15-103	Table-Raising Pinion	1	
15-104	Crank	1	
15-105	Table-Raising Gear	1	
15-106	Woodruff Key	1	
15-107	Nut	1	
15-108	Table-Raising Screw	1	
15-109	Steel Ball, 5/16" dia.	1	
15-110	Plug for Screw	1	
15-111	Rest for Screw	1	

SLOW SPEED ATTACHMENTS For Older Style No. 15 Drills

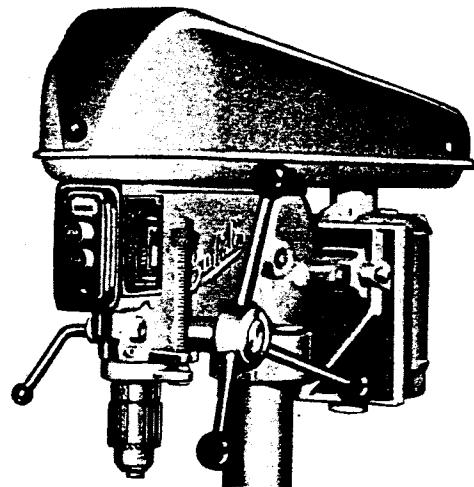
Models 1937-1957



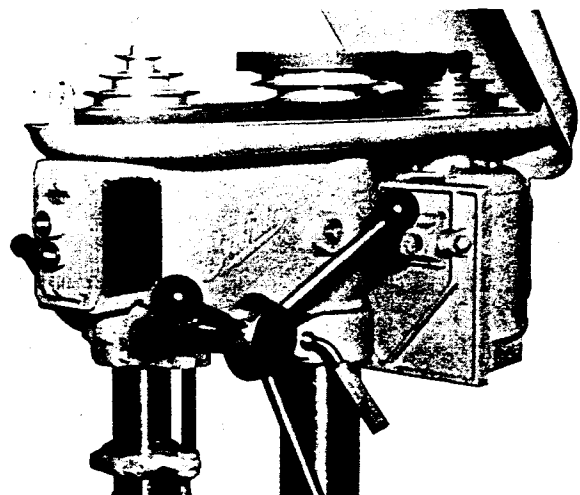
Slow speed attachment is mounted on top of column. Head must be kept in a fixed position near the top of the column and can not be lowered.



Models 1957-1962



Slow speed attachment is mounted inside complete belt guard. Head must be kept at the top of the column and can not be lowered.



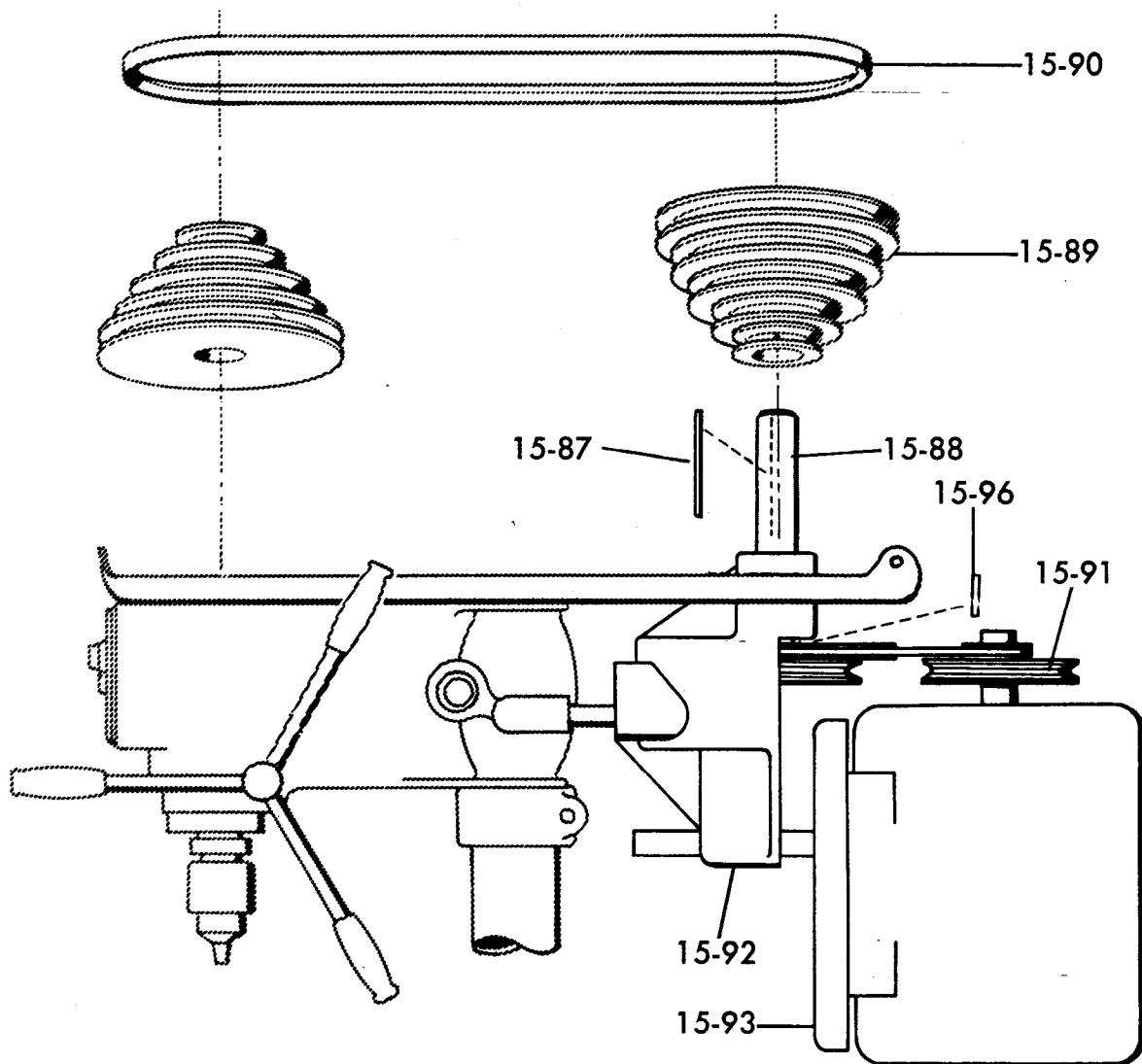
WHEN ORDERING:

1. SLOW SPEED ATTACHMENT . . . always give motor shaft diameter and motor frame number.
2. SPINDLES (for old style machine) . . . advise if present spindle is 2 or 6 spline and if chuck is 6A-2A or 633D.
3. MOTOR PULLEY . . . state bore required.
4. MORTISING or TAPPING ATTACHMENT . . . state

whether machine is old or new model. Attachment can be used only on drills having a chuck mounted on the spindle. Not available for Morse taper spindles.

5. FOOT TREADLE FEED, DEPTH STOP COLLAR, NUTS FOR DEPTH STOP BAR, BELT GUARD, SPINDLE LOCKING SCREW or SPINDLE RETURN SPRING ASSEMBLY . . . state whether machine is old or new model.

SLOW SPEED ATTACHMENT ASSEMBLY FOR MODELS SINCE 1962



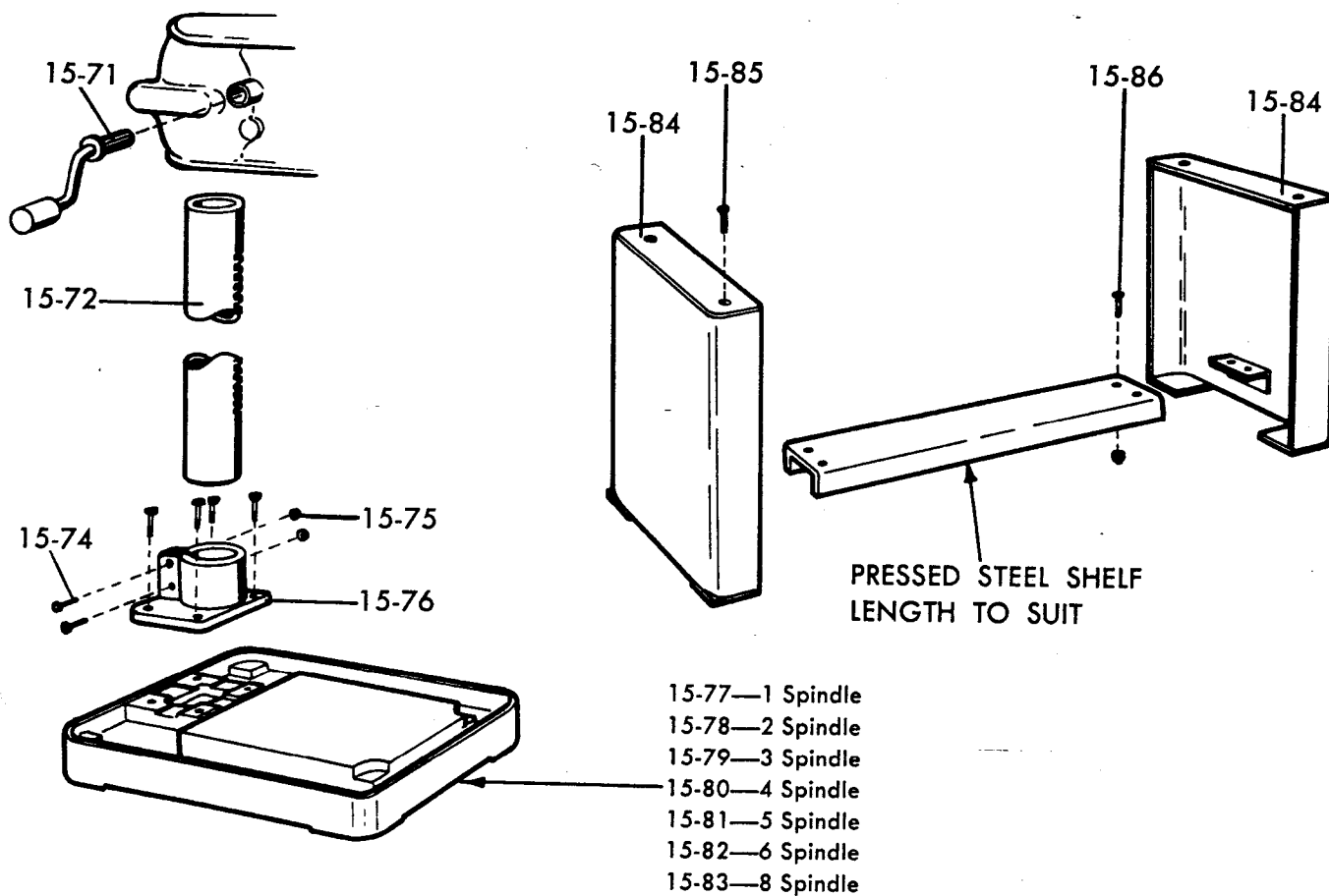
NOTE: Refer Page 11 for Slow Speed Attachments for Older Style Machines.

SLOW SPEED ATTACHMENT PARTS LIST

Part No.	Description	No. Req'd	Remarks
15-87	Key for Intermediate Shaft	1	
15-88	Intermediate Shaft	1	
15-89	Intermediate Pulley	1	
15-90	V-Belt	1	
15-91	Motor Pulley	1	
15-92	Support Bracket	1	
15-93	Motor Bracket	1	
15-94	Ball Bearings	2	Not Shown
15-95	Thumb Screw	1	Not Shown
15-96	Pulley Key	1	

PRODUCTION TYPE BENCH ASSEMBLY

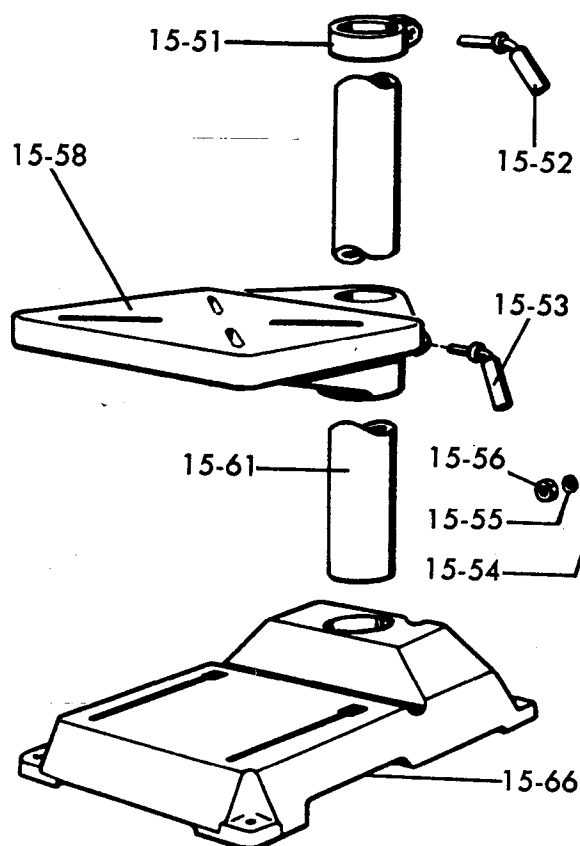
BENCH LEG ASSEMBLY



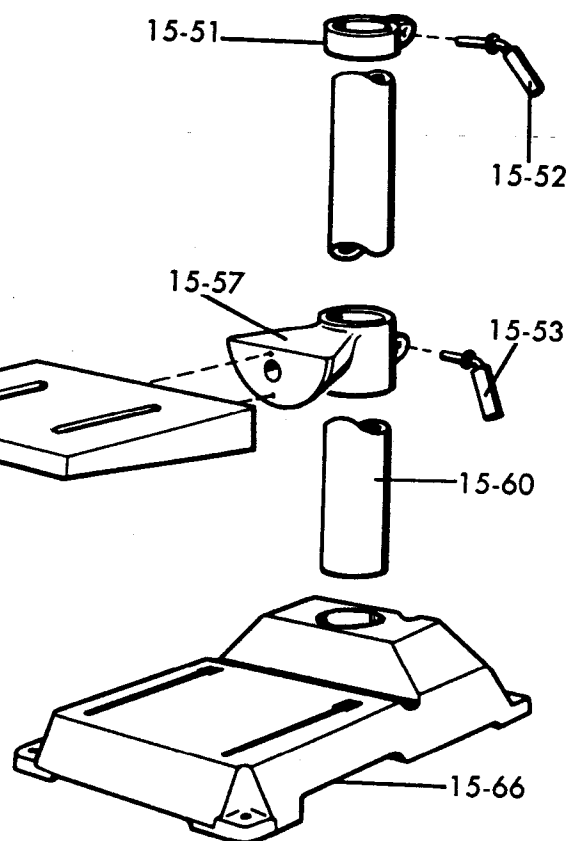
PRODUCTION BENCH DRILL PARTS LIST

Part No.	Description	No. Req'd	Remarks
15-71	Pinion	1	
15-72	Column	1	
15-74	Hexagon Head Cap Screws 1/2-13-1 1/2"	6	
15-75	Hexagon Nuts 1/2-13	2	
15-76	Adapter	1	
15-77	1 Spindle Base	1	
15-78	2 Spindle Base	1	Not Shown
15-79	3 Spindle Base	1	Not Shown
15-80	4 Spindle Base	1	Not Shown
15-81	5 Spindle Base	1	Not Shown
15-82	6 Spindle Base	1	Not Shown
15-83	8 Spindle Base	1	Not Shown
15-84	Bench Legs	2	
15-85	Bolts 1/2-13-3 1/4" long	4	
15-86	Bolts 1/2-13-1 1/2" long	4	

ASSEMBLY OF FLOOR DRILL



STANDARD TABLE



TILT TABLE OPTIONAL EXTRA

Part No.	Description
15-51	Safety Collar
15-52	Clamping Screw for Collar
15-53	Clamping Screw & Nut for Table
15-54	Stud for Table
15-55	Washer for Stud
15-56	Nut for Stud
15-57	Table Fork
15-58	Table
15-59	Index Pin for Table
15-60	Column Floor Type
15-61	Column Bench Type
15-66	Base, Floor or Bench Type
15-53	Clamp Screw & Nut for Table
15-58	Table

No. Req'd		Remarks
1	
1	
1	}
1		
1		
1		
1		Tilt Type Table
1		
1		
1		59¾" long
1		29¼" long
1	
1	}	
1		Standard Table

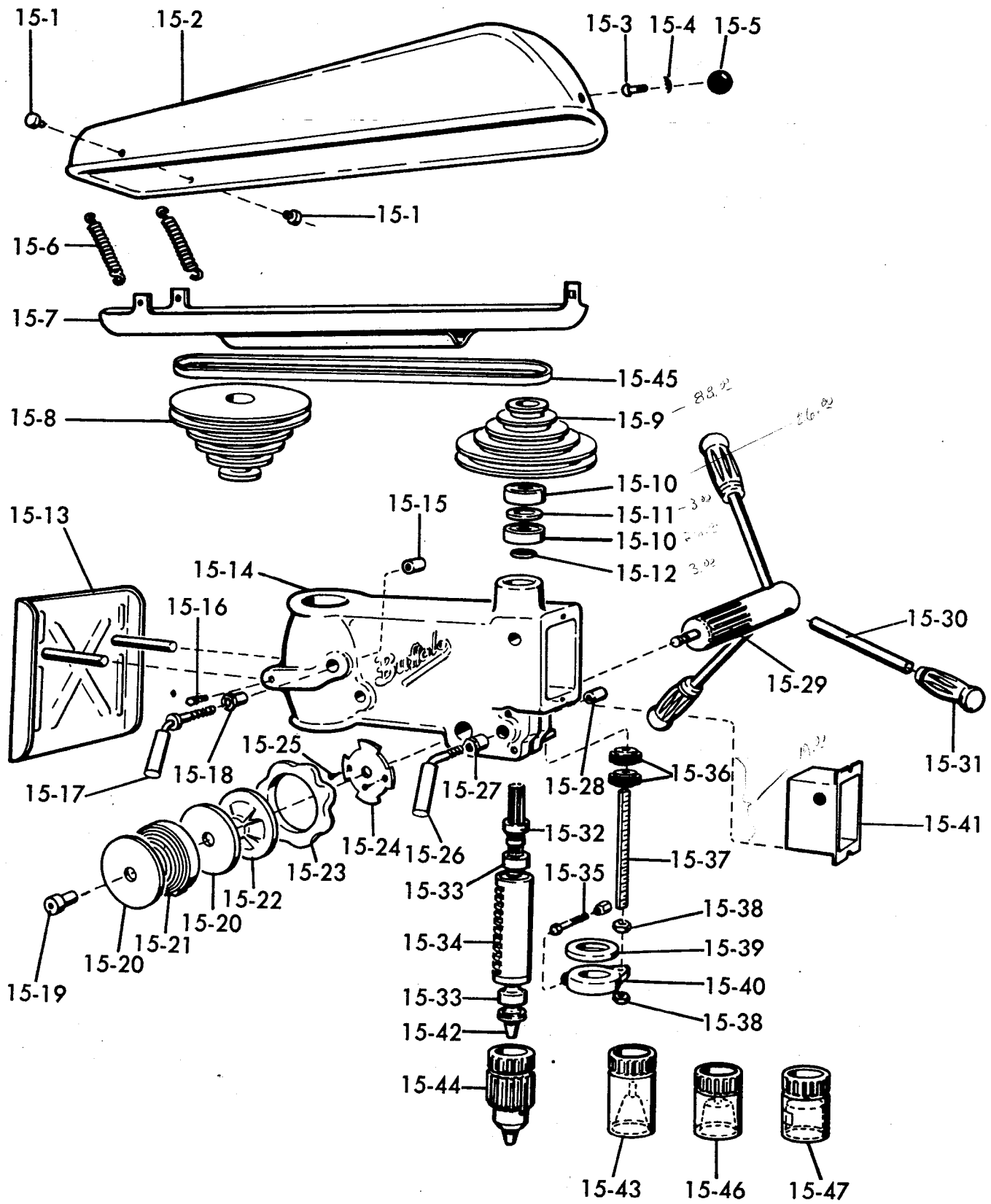
HEAD ASSEMBLY PARTS LIST

(Refer to Page 6 for illustration)

Part No.	Description	No. Req'd	Remarks
15- 1	Hinge Pin for Guard	2	
15- 2	Belt Guard—Upper Half	1	
15- 3	Round Head Machine Screw— $\frac{3}{8}$ -16x $\frac{3}{8}$ "	1	
15- 4	Lockwasher— $\frac{3}{8}$ "	1	
15- 5	Ball $1\frac{1}{8}$ " dia., $\frac{3}{8}$ -16 Tap	1	
15- 6	Spring for Guard	2	
15- 7	Belt Guard—Lower Half	1	
15- 8	Motor Pulley	1	Give motor shaft dia.
15- 9	Spindle Pulley	1	
15-10	Ball Bearing for Spindle Pulley	2	
15-11	Spacer for Pulley Bearings	1	
15-12	Snap Ring for Pulley	1	
15-13	Motor Bracket	1	
15-14	Frame	1	
15-15	Sleeve for Head Clamp Screw	1	Tapped Hole
15-16	Hexagon Head Cap Screw $\frac{1}{4}$ "-20x $\frac{3}{8}$ "	2	
15-17	Head Clamp Screw	1	
15-18	Sleeve for Head Clamp Screw	1	Plain Bore
15-19	Collar for Return Spring	1	
15-20	Washer for Return Spring	2	
15-21	Spindle Return Spring	1	
15-22	Spring for Return Spring	1	
15-23	Adjustment Spring Retainer	1	
15-24	Clutch Plate for Return Spring	1	
15-25	Flat Head Machine Screw #10-32x $\frac{1}{2}$	2	
15-26	Spindle Locking Screw	1	
15-27	Sleeve for Spindle Clamp Screw	1	Plain Bore
15-28	Sleeve for Spindle Clamp Screw	1	Tapped Hole
15-29	Feed Pinion	1	} Order as Feed Pinion Assembly
15-30	Feed Handle	3	
15-31	Handle Grip	3	
15-32	Spindle Bearing Adjustment Collar	1	
15-33	Ball Bearing for Spindle	2	
15-34	Spindle Feed Sleeve (Quill)	1	
15-35	Screw & Nut for Depth Stop Collar	1	
15-36	Knurled Nuts for Depth Stop Bar	2	
15-37	Depth Stop Bar	1	
15-38	Hexagon Nuts for Depth Stop Bar	2	
15-39	Spindle Bumper	1	
15-40	Collar for Depth Stop Bar	1	
15-41	Insulator for Switch Box	1	
15-42	No. 33 Jacobs Taper Spindle	1	For Chuck
15-43	No. 1 Morse Taper Nose	1	
15-44	$\frac{1}{2}$ " Chuck	1	
15-45	V-Belt	1	Give Outside Length
15-46	No. 2 Morse Taper Nose	1	
15-47	Straight Shank Adapter	1	

Refer to Factory for Prices

HEAD ASSEMBLY



REPAIR, DISASSEMBLY AND ASSEMBLY

Aside from lubrication, as shown on lubrication chart, it may become necessary or desirable to dismantle the head for cleaning, inspection or repair.

(Refer to Page 6 for Item Numbers)

A. To Remove Spindle Assembly.

1. Release tension of spindle return spring.
2. Loosen set screws in spindle return spring collar Item 15-19 and remove collar, washers and disc spring. While holding spindle to prevent it from dropping, withdraw feed pinion from right side of frame. Spindle and feed sleeve assembly may then be removed.

B. To Remove Spindle from Feed Sleeve.

1. Back out set screw in collar Item 15-32 and tap splined end of spindle against wooden bench or soft metal block, holding the feed sleeve with the hands.

C. To Remove Spindle Pulley.

1. After the spindle and feed sleeve assembly has been removed from the frame the spindle pulley can be removed by driving it off with a wooden block. Do not use a metal bar as the die cast pulley hub may be damaged.

D. To Reassemble Spindle and Feed Sleeve.

1. Place bearings in feed sleeve and push spindle through.
2. Tap nose of spindle against wooden block until lower bearing has seated.
3. Replace collar Item 15-32 and lock set screw. Do not set bearings too tight. A little end play is better than a tight fit.

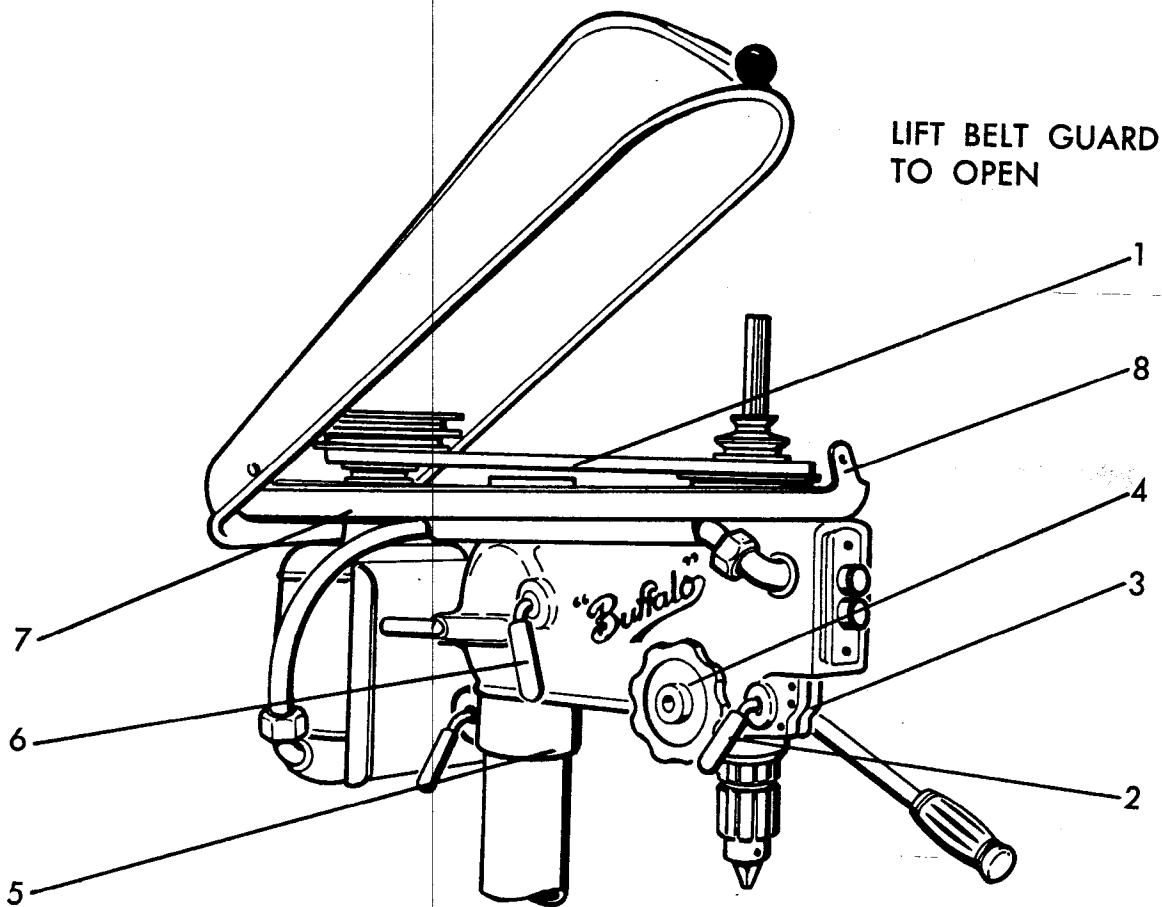
E. To Replace Spindle Pulley.

1. Place spindle and feed sleeve assembly in frame and hold in place with spindle locking screw Item 15-26.
2. Using the spindle as a guide press the pulley and bearings into place.

F. To Reassemble Feed Pinion Assembly.

1. Place spindle assembly in position and insert feed pinion, when spindle is in its maximum up position.
2. Make sure ends of spring are secured both in spring retainer and collar Item 15-19.
3. Adjust return spring to desired tension, spring should be set for a "soft" return. Do not let spindle return too rapidly or damage will result to the teeth of feed sleeve or feed pinion.

ADJUSTMENTS



- 1—Belt Tension—Loosen (2) $\frac{1}{4}$ " hexagon capscrews that lock the motor bracket. With the V-belt in place, rack motor bracket out just to the point where the V-belt may be shifted from one step to another without adjusting motor bracket.
- 2—Spindle Locking Screw—Clamping of this screw will lock the spindle in any desired position. Particularly useful when drill is used for routing, shaping, grinding, etc.
- 3—Wear of Spindle Sleeve in Frame—A split is provided in the frame for taking up the wear in the spindle sleeve bearing. Loosen the set screw and tighten the (2) socket cap-screws evenly to a point where the sleeve slides freely with a minimum amount of shake. After adjusting lightly tighten the set screws.
- 4—Return of Spindle to Normal Position—To increase the return spring tension turn adjusting knob counter clockwise, to release tension pull knob out and let it turn back a notch at a time. No tools are required and the clutch prevents any chance of spring "fly back."
- 5—Safety Collar—Before lowering the head, first move the safety collar down on the column, as far as the head is to be lowered, and lock in place.
- 6—After loosening the head clamp screw it may be necessary to twist the frame on the column to loosen the locking sleeves. After raising the head be sure to lock the safety collar in place under the head.
- 7—There are six holes provided in the bottom half of the guard for adjusting the counter balance springs, so that the top half of the guard will stay in the open position.
- 8—Bend lug on lower half of belt guard so that top half will snap tightly in place.

TWIST DRILL FAILURES

1. Drill Breakage:

Caused by—Lack of lip clearance.
—Speed too slow.
—Dull drill.
—Back lash in work or machine.
—Flutes clogged
(usually found in brass and wood).

2. Broken Tang:

Caused by—Imperfect fit of taper shank. May be caused by nicks, dirt, burrs or wornout socket.

3. Chipping of Lip or Cutting Edge:

Caused by—Too much pressure.
—Too much lip clearance.

4. Oversize Hole:

Caused by—Dull drill.
—Improper grind on drill.
—Wrong lubricant.
—Lack of lubricant.
—Too much pressure.

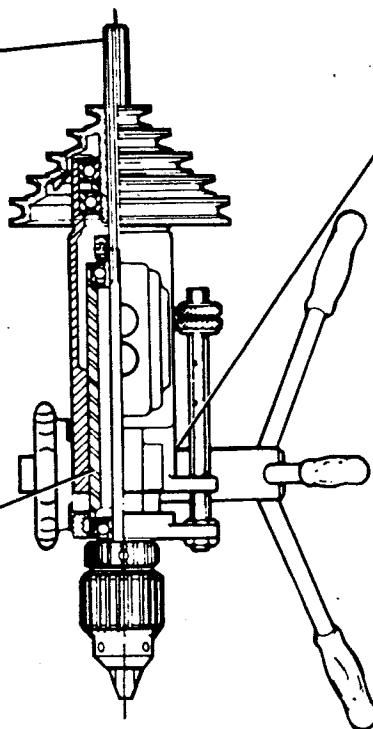
LUBRICATION

LOWER SPINDLE AND
LUBRICATE WITH
SOFT GREASE

BALL BEARINGS
REQUIRE NO
LUBRICATION

LOWER SPINDLE AND
WIPE SPINDLE SLEEVE
WITH LIGHT GREASE
ONCE A WEEK

LUBRICATE FEED
PINION ON SIDE
OF SLIDING HEAD
WITH 2 DROPS OF
SAE 30 DAILY



All bearings are ball bearing, and are packed with grease when they leave the factory and need no further attention. It is desirable to run the bearings until they lose their accuracy or fail and then replace them. This practice is recommended by the manufacturer of the bearings used in this drill.

The following lubrication is suggested:

1. Oil feed pinion bearings daily with SAE 30 oil, as shown on lubrication chart.
2. Once a week, or more often if service conditions are severe, rack feed sleeve to its maximum down position, clean thoroughly and wipe with light grease.
3. At intervals of one or two months, the upper spindle should be lubricated by lowering spindle and forcing soft grease down through the splines of the spindle.

INSTALLATION

Foundation

The size and weight of the Buffalo No. 15 Drill is such that no special foundation is required. The base is provided with bolt holes to receive either foundation bolts, as in the case of concrete foundation or lag screws which are sufficient for wood flooring. The foundation bolts or lag screws should be $\frac{1}{2}$ " diameter.

Erection

The machine should be set level and corners shimmed if necessary. Equal pressure should be applied on all foundation bolts to prevent cracking or warping the base. When erecting or planning space for machine, leave sufficient space on all sides for maintenance and repair.

Motor

Bolt the motor on the bracket vertically in line with the spindle. Locate the motor pulley so that the top surface of the pulley is in line with the top of the spindle pulley. Oil the motor (if provided with oilers) not more often than once in two months. Wiring must be heavy enough so full voltage will be applied to motor during starting.

For 3 Phase Circuit

Electrical connections should be made and checked by a competent electrician. Wiring diagrams are found in the cover of the starting switch.

OPERATION

Before placing machine in operation it should be carefully cleaned of all grease and dirt. The protective coating of grease is a rust preventative and not a lubricant. Do not attempt operation without first removing this grease.

The Vee-belt should be clean and free from dirt or grease. Tighten the motor bracket to the point where the Vee-belt can be shifted from one step to another on the pulleys without adjustment of the motor bracket.

Chuck

When mounting No. 633-D chuck on the spindle make sure the spindle nose is wiped clean. Clean out taper hole of the chuck and place on spindle. Draw chuck onto spindle by tightening threaded collar of chuck on spindle. End of chuck key handle is used for tightening collar. If it ever becomes necessary to remove the chuck from spindle, unscrewing the threaded collar will push chuck off spindle nose.

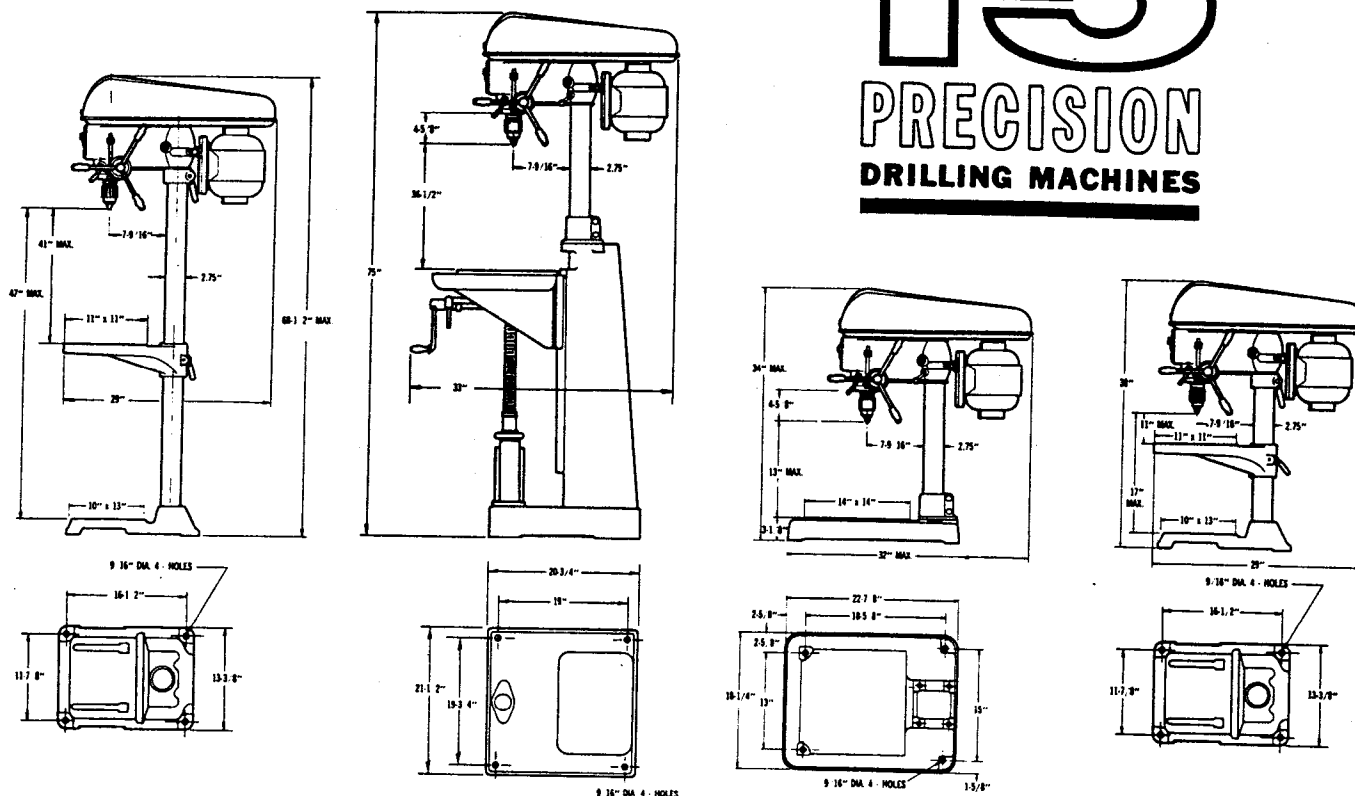
When the spindle nose is fitted with a No. 2 Morse taper socket and a twist drill having a No. 1 shank is used, a sleeve must first be inserted into the spindle nose. Be sure both sockets are clean and free from dirt or they will not "grip." When using straight shank drills, a chuck with arbor is used. Be especially careful that both spindle socket and arbor are clean before using chuck.

SAFETY PRECAUTIONS

1. Don't change belt with motor running.
2. Don't try to hold work—get a clamp or vise.
3. Don't force the work—you will dull or break the drill.
4. Don't try to stop revolving work—a broken drill is cheaper than a broken finger.
5. Don't take chances—if you are not sure, ask your superior.

GENERAL SPECIFICATIONS

NUMBER 15 PRECISION DRILLING MACHINES



NO. 15 DRILLING MACHINES				No. 15 Tapper		
	No. 15 Bench	No. 15 Floor	No. 15 Prod. Bench	No. 15 Pedestal	No. 0	No. 1
Capacity in Cast Iron	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"
Motor H.P.—Standard	1/2	1/2	1/2	1/2	1/2	1/2
Spindle Sleeve Diameter	1.747"	1.747"	1.747"	1.747"	1.747"	1.747"
Max. Dist., Spindle Nose to Base	17"	47"	13"	—	43 1/2"	42"
Max. Dist., Spindle Nose to Table	11"	41"	—	36 1/2"	37"	35 1/2"
Feed Travel	4 1/2"	4 1/2"	4 1/2"	4 1/2"	2 1/2"	2 1/2"
Column Diameter	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"
Maximum Height	38"	68 1/2"	34"	75"	68 1/2"	68 1/2"
Net Weight, Lbs.	96	133	182	435	155	162
Working Surface of Base	9 x 11"	9 x 11"	14 x 14"	—	9 x 11"	9 x 11"
Working Surface of Table	11 x 11"	11 x 11"	—	14 x 18"	10 x 11"	10 x 11"
Spindle Nose No. 33 Jacobs Taper or No. 1 or No. 2 Morse Taper Noses						
Spindle Speeds—All Models:						
With 1750 RPM Motor				460	920	1725 — 3400 — 6300
With 1450 RPM Motor				380	760	1450 — 2850 — 5300
With 1140 RPM Motor				295	600	1140 — 2200 — 4200
NO. 15 MULTIPLE SPINDLE DRILLS						
Spindles	Working Surface of Table		Center Distance Between Spindles			
	Production Bench	Pedestal	Production Bench	Pedestal		
1	14 x 14"	14 x 18"	—	—		
2	14 x 26"	14 x 30"	12 1/4"	10"		
3	14 x 38 1/2"	14 x 42"	12"	10"		
4	14 x 50 1/2"	14 x 54"	12"	10"		
6	14 x 74 1/2"	14 x 65 1/4"	12"	10"		
8	14 x 91"	17 x 114"	10 11/16"	13 3/4"		