MAINTENANCE MANUAL and SPARE PARTS CATALOG

"Buffalo" No. 18 DRILLS

BUFFALO FORGE COMPANY
BUFFALO, NEW YORK
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

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INTRODUCTION

This little manual is intended to guide the users of the machine in its use, operation, maintenance and repair. The materials of construction have been carefully selected for durability and strength and all machined surfaces are held to accurate limits. With ordinary care and use it will give years of accurate satisfactory service.

INSTALLATION AND OPERATION

Foundation

The size and weight of the Buffalo No. 18 drill are 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 $\frac{5}{8}$" 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.

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.

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

The Vee-belt should be free from dirt and grease and should be tightened to the point where the slack side throws a loop approximately 1" from a line of tangents between the pulley. A tight belt wears quickly and creates unwanted vibration.

The spindle nose is fitted with a No. 3 Morse taper socket. To use twist drills having a No. 1 shank, 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 and arbor is used. Be especially careful that both spindle socket and arbor are clean before using chuck. Place chuck and arbor in socket and with chuck jaws drawn down inside of chuck body, strike chuck a smart blow with wooden block or Babbitt hammer.

Before drilling any material, check to make sure the drill is correctly ground—the proper speed is set, and the work to be drilled is securely fastened.

TWIST DRILL FAILURES AND THEIR CAUSES

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 worn-out socket.

3. **Chipping of lip or cutting edge:**
   Caused by—Too much pressure.
   — Too much lip clearance.

4. **Oversize hole:**
   Caused by—Unequal angle of point.
   — Unequal length of cutting edge.
   —Loose spindle.

5. **Rough hole:**
   Caused by—Dull drill.
   — Improper grind on drill.
   — Wrong or lack of lubricant.
   —Too much pressure.

A FEW "DON'TS" FOR OPERATOR

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.

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.**

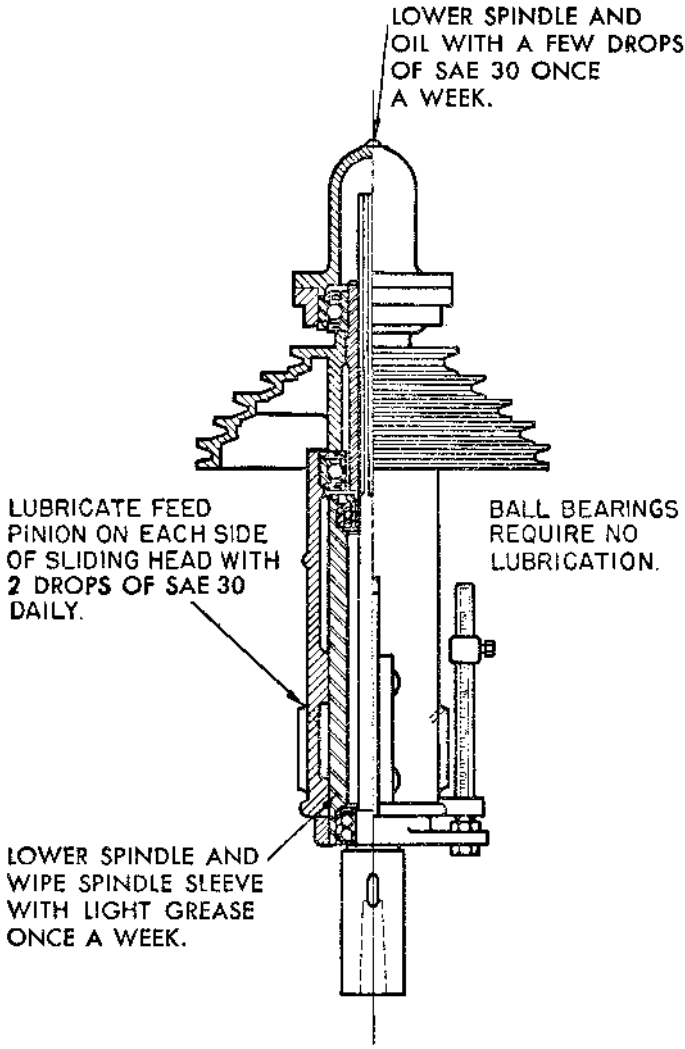
FEED AND SPEED FOR DRILLS OF HI-SPEED STEEL

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	Feed per Revolution, 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	0.003	2,445	3,056	3,667	4,889	5,500	6,112	6,724	12,224
3/32	0.0035	1,628	2,038	2,442	3,258	3,666	4,584	5,043	9,168
1/8	0.004	1,222	1,528	1,833	2,445	2,750	3,056	3,362	6,112
5/32	0.0045	976	1,221	1,465	1,954	2,198	2,546	2,802	5,092
3/16	0.005	815	1,019	1,222	1,630	1,833	2,036	2,242	4,072
7/32	0.0055	698	872	1,047	1,396	1,570	1,781	1,962	3,564
1/4	0.006	611	764	917	1,222	1,375	1,528	1,681	3,056
9/32	0.0065	542	678	814	1,084	1,222	1,375	1,513	2,750
5/16	0.007	489	611	733	978	1,100	1,222	1,344	2,444
11/32	0.0075	444	555	666	888	1,000	1,120	1,233	2,290
3/8	0.008	407	509	611	815	917	1,018	1,121	2,036
13/32	0.0085	376	469	563	752	846	946	971	1,892
7/16	0.009	349	437	524	698	786	874	921	1,748
15/32	0.0095	326	407	488	652	732	819	881	1,638
1/2	0.010	306	382	458	611	688	764	840	1,528
9/16	0.0105	271	339	407	543	611	679	747	1,358
5/8	0.011	244	306	367	489	550	612	673	1,224
11/16	0.0115	222	277	333	444	500	555	611	1,110
3/4	0.012	204	255	306	407	458	508	559	1,016
13/16	0.0125	188	234	281	376	423	474	521	948
7/8	0.013	175	218	262	349	393	438	482	876
15/16	0.0135	163	203	244	326	366	407	448	814
1	0.014	153	191	229	306	344	382	420	764

Operation Under Abnormal Conditions:

No particular precaution need be taken other than cleanliness in the case of dirt or mud. In case of extreme low temperature, sudden shock loads should be avoided and the machine should be run slowly several minutes before applying a load or running at high speeds.



LUBRICATION

All bearings are sealed and require no lubrication **throughout their** life.

The following lubrication is suggested :

1. Oil feed pinion bearings daily with SAE 30 oil, through small holes on top of hubs, *as* shown on lubrication chart.
2. Once a week, or oftener 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 weeks, the upper spindle should be oiled through the Empress oiler on top of cover 10206.

REPAIR

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

(a.) **To remove** spindle assembly.

1. Place a wrench securely on collar 11787 to prevent spring from flying out and back off 5/16 setscrew. Unwind spring slowly and when free, feed pinion assembly can be withdrawn.

2. Remove collar 10251 and spindle assembly can be withdrawn.

(b.) **To remove spindle from feed sleeve.**

1. Back out setscrew in collar 10210 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 assembly.

1. Remove cover 10206 and guard 10225.

2. Exert equal pressure on at least two places on lower edge of pulley pushing it up to clear top bearing from its seat. This can also be done by exerting pressure against lower end of sleeve 10208-P1. Do not use hard metal when driving against sleeve—use wooden or brass bar as end of sleeve can become slightly upset and destroy the fit of the external and internal splines. When top bearing has cleared its seat, it can be removed from sleeve, as can lower bearing; with both bearings removed, the sleeve can be pushed through the pulley.

(d.) **To replace spindle pulley assembly.**

1. Seat bearing in lower bearing seat (in frame proper).

2. Place pulley in position and push sleeve through—entering it into lower bearing.

3. Replace key and upper bearing.

4. Replace cover and guard.

(e.) To reassemble **spindle and sleeve.**

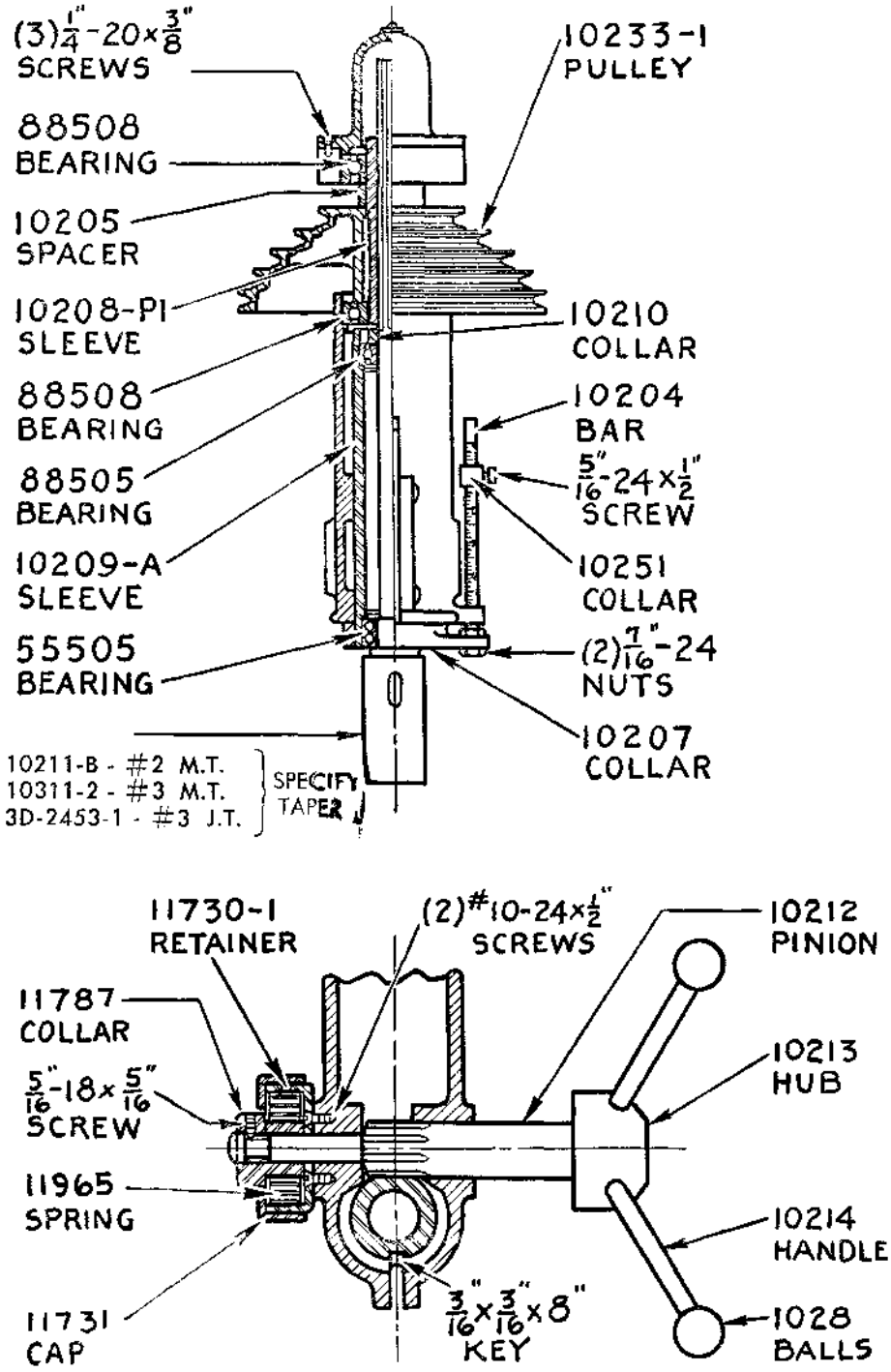
Place bearing 55505 in seat and push spindle through. Place bearing No. 88505 in seat and assembly collar 10210 inside of bearing. Tighten setscrew. Be careful not to get end adjustment too tight. A small amount of end play is more desirable than a tight fit.

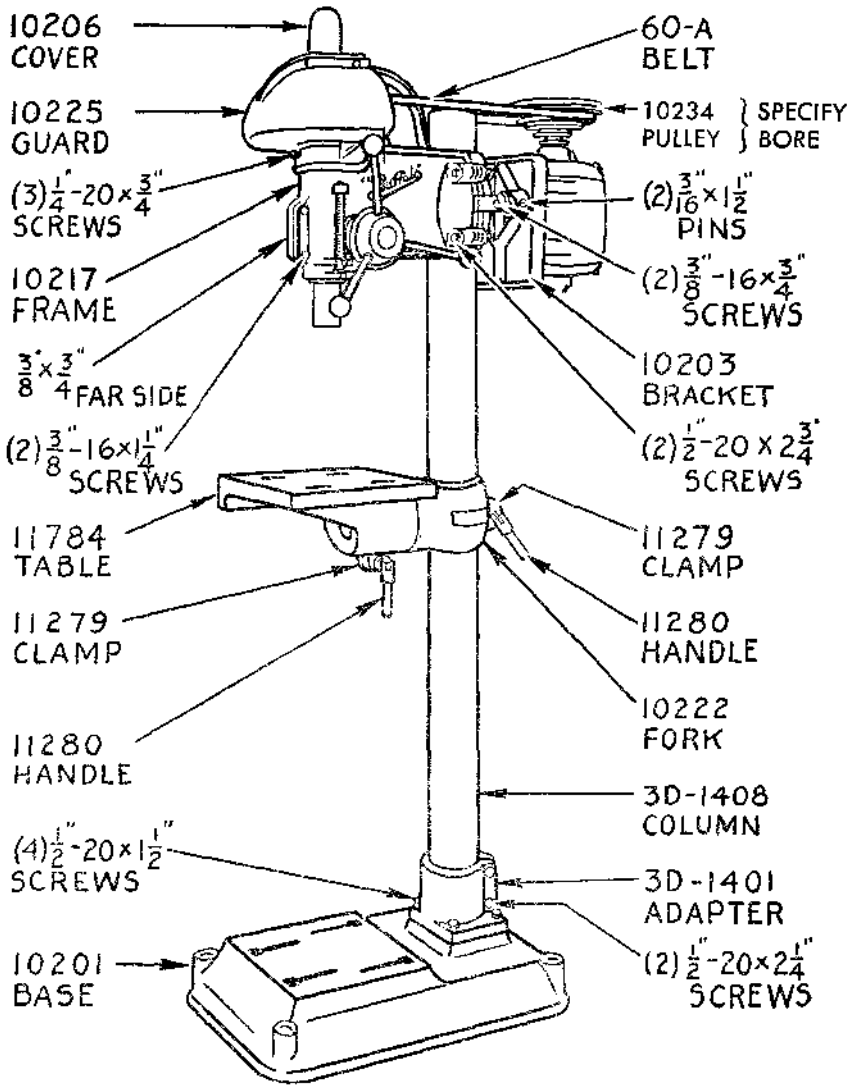
(f.) **To reassemble feed pinion assembly.**

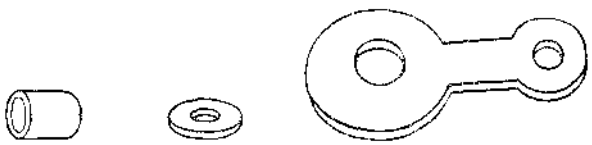
1. Place spindle assembly in position and insert feed pinion, when spindle is at maximum up position.

2. Make sure return spring is attached bcth to Retainer 11730-1 and collar 11787.

3.Wind spring 11965 with wrench on collar 11787 and tighten setscrew. Tighten spring so that spindle returns gently.


(3) 1/4"-20 x 3/8" SCREWS
88508 BEARING
10205 SPACER
10208-P1 SLEEVE
88508 BEARING
88505 BEARING
10209-A SLEEVE
55505 BEARING
10211-B - #2 M.T.
10311-2 - #3 M.T.
3D-2453-1 - #3 J.T.
SPECIFY TAPER
10233-1 PULLEY
10210 COLLAR
10204 BAR
5/16"-24 x 1/2" SCREW
10251 COLLAR
(2) 7/16"-24 NUTS
10207 COLLAR
11730-1 RETAINER
(2) #10-24 x 1/2" SCREWS
10212 PINION
11787 COLLAR
5/16"-18 x 5/16" SCREW
10213 HUB
11965 SPRING
10214 HANDLE
11731 CAP
3/16" x 3/16" x 8" KEY
1028 BALLS



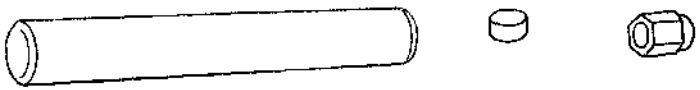


11813-1
BUSHING

11813-2
WASHER

11814-1
LATCH

11814-2
WEIGHT



10244
POST

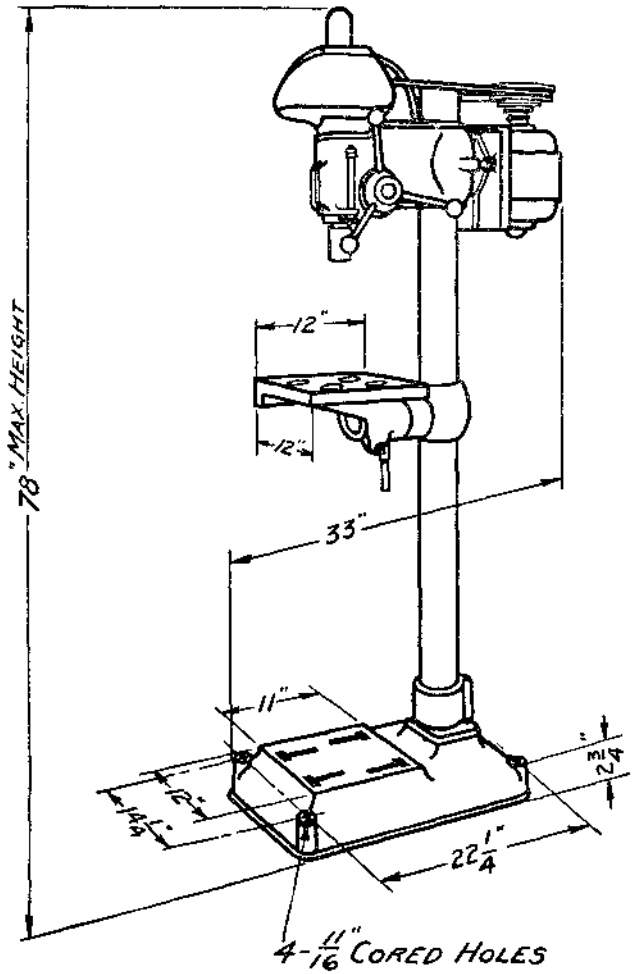
11180-1
PLUG

11196
NUT

NO. 18 DRILL—REPAIR PARTS LIST

Item No.	No. Req'd	Description	Material	Weight Ea. Lbs.
60-A	1	Belt Drive "Gates"	Rubber	½
1028	3	Ball for Feed Handle	Molded	¼
3D-1401	1	Adapter	C. I.	13
	4	Screw, Cap, ½"-13 x 1½", Hex. Head	Steel	¼
	2	Screw, Cap, ½"-13 x 2¼", Hex. Head	Steel	¼
3D-1408	1	Column	Steel	66
3D-1409	1	Column (Bench Type)	Steel	35
3D-2453-1	1	Spindle, No. 3, Jacobs Taper	Steel	4
10201	1	Base	C. I.	73
10203	1	Bracket, for Motor	C. I.	16
	2	Pin, Drive, ⅛" x 1½"	Steel	1/16
10204	1	Bar for Depth Stop	Steel	½
	2	Nut, Jam, ⅛"-24 (Cadmium Plated)	Steel	1/16
10205	1	Spacer, for Upper Ball Bearing	Steel	¼
10206	1	Cover, for Spindle	C. I.	3
	3	Screw, Cap, ¼"-20 x ⅜", Fillister Hd.	Steel	1/16
10207	1	Collar for Depth Stop	C. I.	1½
	1	Screw, Cap, ¼-20 x 2" (Cadmium Plated)	Steel	1/16
10208-PI	1	Sleeve, Spindle Pulley	Steel	2¼
10209-A	1	Sleeve, Spindle	Steel	7½
	1	Key, ⅜" x ⅜" x 8"	Key St.	⅛
10210	1	Collar, Spindle Bearing	Steel	¼
	1	Screw, Set, ¼"-20 x ¼", "Bristo"	Steel	1/16
10211-B	1	Spindle, No. 2, Morse Taper	Steel	5½
10212	1	Pinion, Feed, Assembled	Steel	7
10213	1	Hub for Feed Pinion, Assembled	Steel	
10214	3	Handle for Feed Pinion	Steel	¼
10217	1	Frame	C. I.	43½
	2	Screw, Cap, ⅜"-16 x 1¼"	Steel	1/16
	1	Screw, Set, ⅜"-16 x ¾", "Bristo"	Steel	1/16
	2	Screw, Cap, ½"-20 x 2¾"	Steel	⅛
	2	Nut, ½"-20, Hex	Steel	1/16
	2	Screw, Thumb, ⅜"-16 x ¾"	Steel	1/16
10222	1	Fork, Table	C. I.	18½
10225	1	Guard for Spindle Pulley	C. I.	15¼
	3	Screw, Cap, ¼-20 x ¾"	Steel	1/16
10233-1	1	Pulley, Spindle	Die Cast.	5¼
	1	Key, ¼" x ¼" x 1⅞"	Key St.	1/16
10234	1	Pulley, Motor	Die Cast.	3
	1	Screw, Set, ⅛"-18 x ⅛", "Bristo"	Steel	1/16
10244	2	Rod for Motor Bracket	Steel	1
10251	1	Collar for Depth Stop Bar	Steel	¼
	1	Screw, Hex. Hd. Cap, ⅛"-24 x ½"	Steel	1/16
10311-2	1	Spindle, No. 3 Morse Taper	Steel	6
11180-1	2	Plug for Motor Bracket	Brass	1/16
11196	1	Nut for Depth Stop Collar	Steel	1/16
11279	2	Screws, Locking { 1 for Table, 1 for Table Fork }	Steel	¼
11280	2	Handle for Locking Screws	Steel	¼
11730-1	1	Retainer for Spindle Return Spring	Steel	¼
	2	Screw, Flat Head, No. 10-24 x ½"	Steel	1/16
11731	1	Cap for Spring Retainer	Steel	½
11784	1	Table	C. I.	36
11787	1	Collar for Feed Pinion	Steel	¾
	1	Screw, Set, ⅛"-18 x ⅛", "Bristo"	Steel	1/16
11813-1	1	Bushing for Safety Latch	St. Tubing	1/16
11813-2	1	Washer for Safety Latch	Steel	1/16
11814-1	1	Safety Latch	Steel	⅛
11814-2	1	Weight for Latch	Steel	⅛
11965	1	Spring for Spindle Return	Sp. St.	¾
	2	Screws, Round Head, No. 8-32 x ¼"	Steel	1/16
	1	Ball Bearing, "New Departure" (55505)	St.	½
	1	Ball Bearing, "New Departure" (88505)	St.	½
	2	Ball Bearing, "New Departure" (88508)	St.	1¼

PRICES ON APPLICATION



GENERAL SPECIFICATIONS

Capacity	1″
Maximum distance spindle nose to table	34″
Maximum distance spindle nose to base	50″
Column diameter	3.906
Feed travel	5″
Swing	18″
Spindle—Morse taper	#3
Working surface of base	11 x 12″
Net Weight	335 lbs.
Speeds	400—670—1100—1800—3000
Overall height	78″
Overall width	17″
Overall depth (with motor)	33″
Spindle diameter	15/16″
Working surface of table	12 x 12″
Spindle sleeve diameter	2⅜″

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