

TECHNICAL MANUAL

**OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT
AND GENERAL SUPPORT MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS UST)**

FOR

**MILLING MACHINE
MODEL NO. 4
(BURKE DIVISION POWERMATIC/HOUDAILLE, INC.)
(NSN 3417-00-357-1948)**

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Technical Manual

No. 9-3417-215-14&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 15 July 1981

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AND GENERAL SUPPORT MAINTENANCE MANUAL
(INCLUDING**

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(NSN 3417-00-357-1948)**

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 Materiel Readiness Command, ATTN: DRSAR-MAS, Rock Island, IL 61299. A reply will be furnished direct to you.

NOTE

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

Manufactured by: Burke Division Powermatic/Houdaille, Inc.
38 Brotherton Road
Cincinnati, OH 45227

Procured under Contract No. DAAA09-78-C-5160

This technical manual is an authentication of the manufacturers' commercial literature and does not conform with the format and content specified in AR 310-3, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.

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 - 80339
- 2 - Manufacturer's Part Number exactly as listed herein.
- 3 - Nomenclature exactly as listed herein, including dimensions, if necessary.
- 4 - Manufacturer's Model Number - Model No. 4
- 5 - Manufacturer's Serial Number (End Item)
- 6 - Any other information such as Type, Frame Number, and Electrical Characteristics, if applicable.
- 7 - If 00 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 - 80339 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: 3417-00-357-1948
Manufacturer: Burke Division Powermatic/Houdaille, Inc.
38 Brotherton Road
Cincinnati, OH 45227

Model: No. 4
Serial: (of end item)

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

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SETTING UP THE MACHINE

The #4 Milling Machine is an accurate machine tool. It should be carefully handled at all times.

The most satisfactory manner of moving the machine after it has been uncrated is to fasten ropes under both the front and rear of the overarm, and gently lift it with a crane. Extreme caution should be used to avoid jarring, dropping, or nicking any of the surfaces.

For optimum results be sure that the machine is leveled and rigidly secured.

Before operating, remove the protective shipping sludge with clear gasoline; oil the bearing surfaces and lead screws. If available, it is suggested that the excess gasoline be blown off with compressed air. Be sure to clean all particles of dirt from inside the spindle opening, and use equal care in cleaning the tapered shank of the drive arbor.

LUBRICATING INSTRUCTIONS

Machine:

The spindle of the #4 Milling Machine is equipped with grease-lubricated roller bearings. The proper amount of lubricant has been applied at the factory. Every month, or after approximately 150 hours of operation, additional grease should be added. Use-grease similar to Lubriplate #310.

Each time the spindle is lubricated add a small amount of the same grease to the gear box.

All moving parts, including lead screws, shafts, and the knee, saddle, and table ways should be oiled after each day's operation. Any good grade of lubricating oil may be used for this purpose.

Motor:

Ball bearing gearhead motors provided with these Milling Machines are lubricated at the factory. Every 1000 hours of operation, (usually six months), additional lubricant should be added. Use any good grade of ball bearing grease, but do not over-lubricate.

OPERATING INSTRUCTIONS

The operation of the #4 Milling Machine is so simple that no specific instructions are required. For possible assistance, the following is suggested:

Spindle Speeds: To change spindle speeds, raise the motor, place the driving V belt in the proper groove on the motor pulley and in the corresponding groove on the spindle pulley. The smallest groove on the motor pulley produces the slowest spindle speed.

Power Feed Speeds: There are four alternative longitudinal table feed speeds for each spindle speed. The smallest groove on the power feed drive pulley (attached to the spindle) provides the slowest table feed.

Power Feed: To engage the power feed, depress the power feed pawl (part B-713) while the motor is running. Throwouts (parts B-723) may be set to disengage the power feed automatically where desired. The table feed may also be stopped by turning off the motor or by manually disengaging the pawl. Reversing the motor will reverse the direction of table travel.

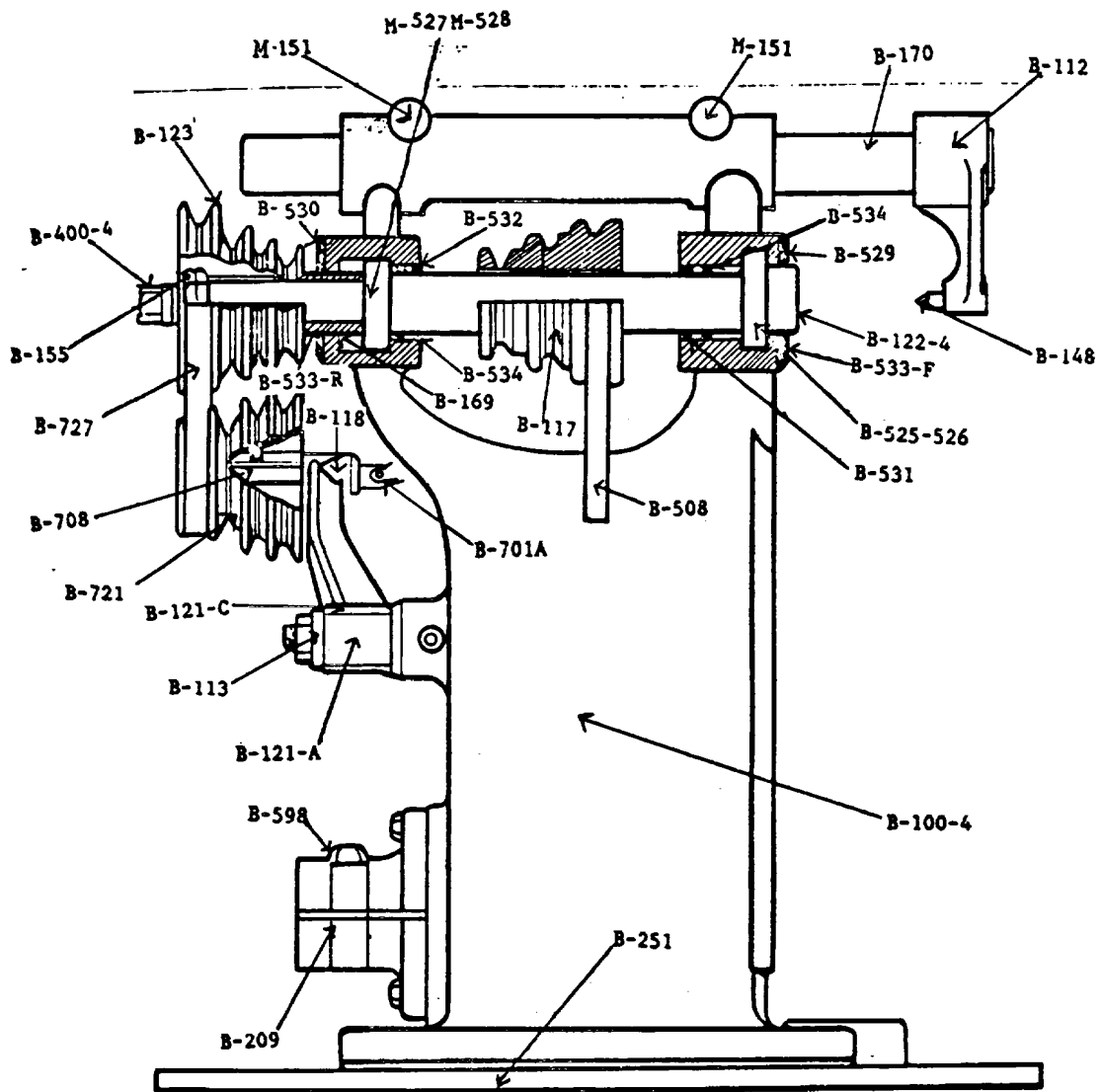
Gib Adjustment: Adjustable gibs are provided between the table and saddle (table gib), saddle and knee (saddle gib), and knee and column (knee gib). The saddle and knee gibs are each provided with three adjusting screws, the center one of which is the lock screw.

After the machine has been set up for a particular horizontal milling operation, lock the saddle and knee gibs in place. This will assure additional rigidity. The table gib is provided with four adjusting set screws and nuts.

The tension on each of these screws should be approximately the same, with the nuts tightened in place to maintain constant torque.

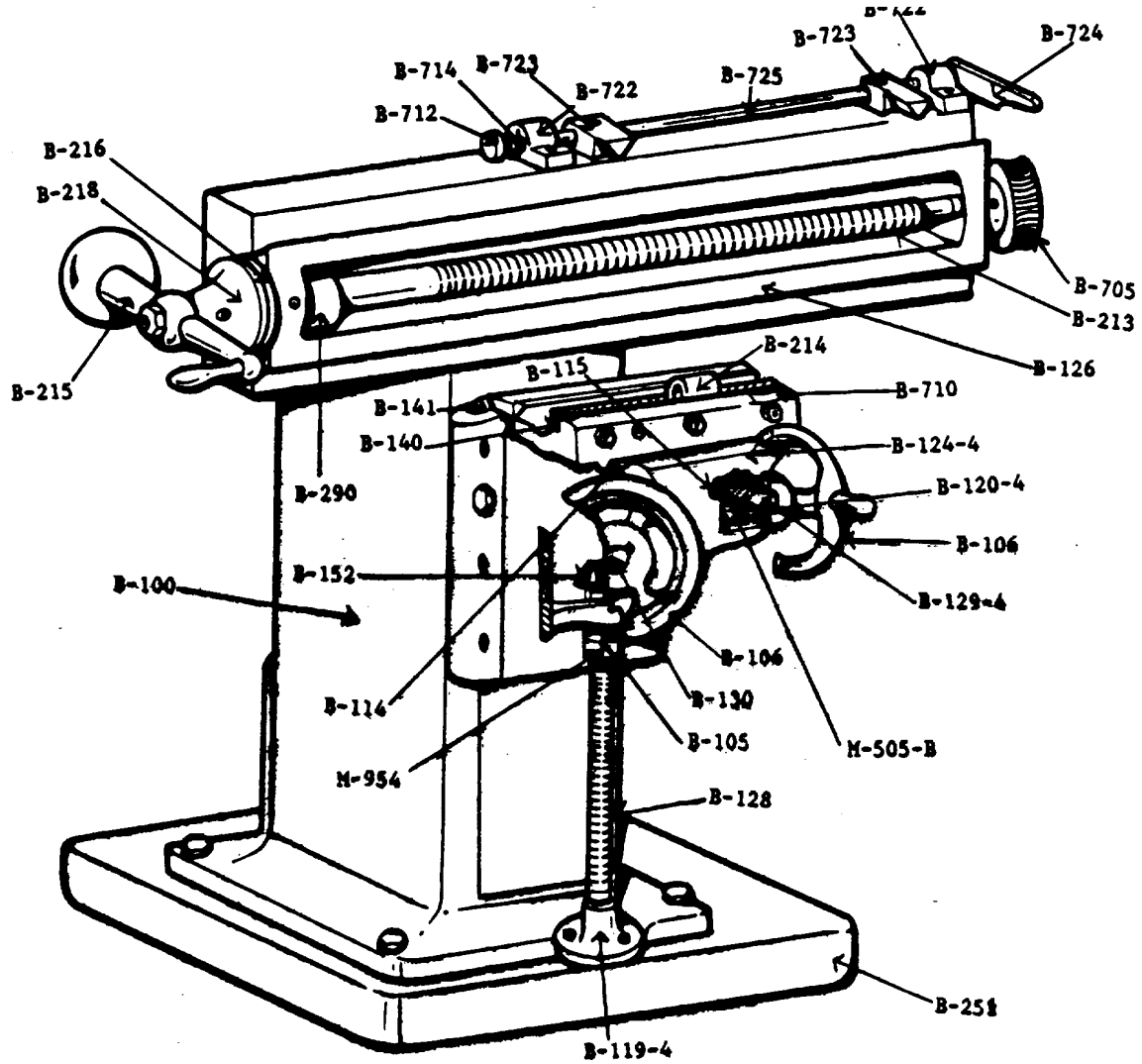
Starting Switch: To reverse the direction of rotation of the motor, turn the drum type switch handle to the neutral position, and allow the motor to come to a complete stop. Then turn the switch handle to the reverse position.

COLUMN ASSEMBLY



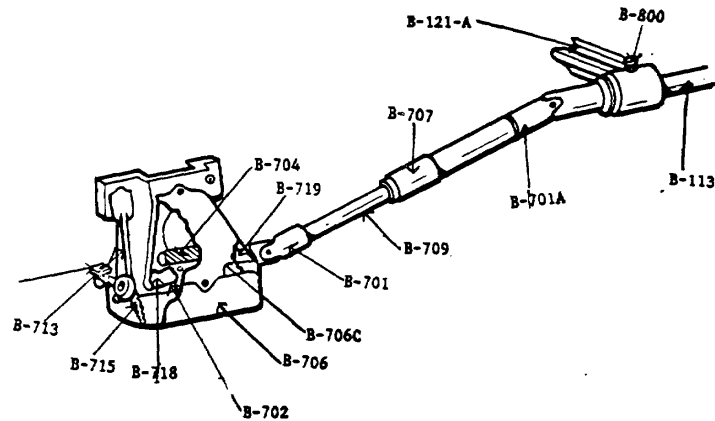
- | | | | |
|---------|-----------------------------|---------|------------------------------------|
| B-100-4 | Column | B-525 | Bearing, cup (front) |
| B-112 | Overarm Bracket | B-526 | Bearing, cone (front) |
| B-113 | Stud, Power Feed Arm | M-527 | Bearing, cup (rear) |
| B-117 | Spindle Pulley | M-528 | Bearing, cone (rear) |
| B-118 | Bearing, for power feed arm | B-529 | Lubricant retainer (outside front) |
| B-121-A | Arm, power feed | B-530 | Lubricant retainer (outside rear) |
| B-121-C | Bushing, power feed arm | B-531 | Plastic retaining rings (2) |
| B-122-4 | Spindle | B-532 | Plastic retaining rings (2) |
| B-122-4 | Spindle | B-533-E | Seal (felt) |
| B-123 | Pulley, power feed | B-533-R | Seal (felt) |
| B-148 | Arbor Center | B-534 | Seal* (felt) (2) |
| B-155 | Spindle adjusting nuts | B-850-A | Overarm Clamp Screws (Not shown) |
| B-169 | Bushing, spindle spacing | M-151 | Screw-Handles (2) |
| B-170 | Overarm | B-598 | Binder Bolt |
| B-209 | Motor Bracket | B-701-A | Universal Joint |
| B-251 | Oil Pan | B-708 | Sleeve |
| B-400-4 | Draw Bar | B-721 | Pulley-power feed (driven) |
| B-508 | V belt (Motor to spindle) | B-727 | V belt (Power feed) |

KNEE, SADDLE and TABLE ASSEMBLY



B-100	Column	B-215	Ball crank handle
B-105	Thrust Bearing	B-216	Bushing, table feed
B-106	Handwheel	B-218	Dial, table feed
B-114	Gib, saddle	B-251	Oil pan
B-115	Nut, crossfeed	B-290	Collar for screw
B-119-4	Nut, vertical feed	M-505-B	Hex nuts
B-120-4	Bushing, crossfeed	B-705	Bronze worm gear
B-124-4	Knee	B-710	Throwout cam
B-126	Table	B-712	Trip rod collar
B-128	Screw, vertical feed	B-714	Trip rod spring
B-129-4	Screw, crossfeed	B-722	Trip rod bearing brackets (2)
B-130	Shaft, vertical feed	B-723	Trip rod throw-outs (2)
B-140	Gib, table	B-724	Trip rod finger
B-141	Gib, knee	B-725	Trip rod
B-152	Pinion Gear	B-954	Tapered Pin
B-213	Screw, table feed		
B-214	Nut, table feed		

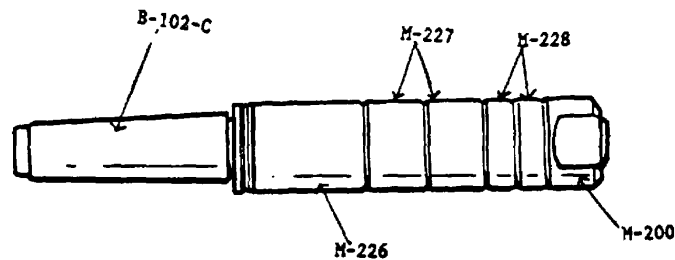
GEAR BOX - POWER FEED



Gear Box Power Feed

B-113	Stud, power feed arm	B-707	Telescope tube
B-121-A	Arm, power feed	B-709	Telescope shaft
B-701	Universal joint	B-713	Pawl, power feed
B-701-A	Universal joint	B-713-P	Plate, power feed pawl
B-702	Yoke, Gear Box	B-715	Spring, gear box
B-704	Steel Worm	B-718	Stud, yoke
B-706	Gear Box	B-719	Worm Shaft
B-706-C	Gear Box Cover	B-800	Oiler

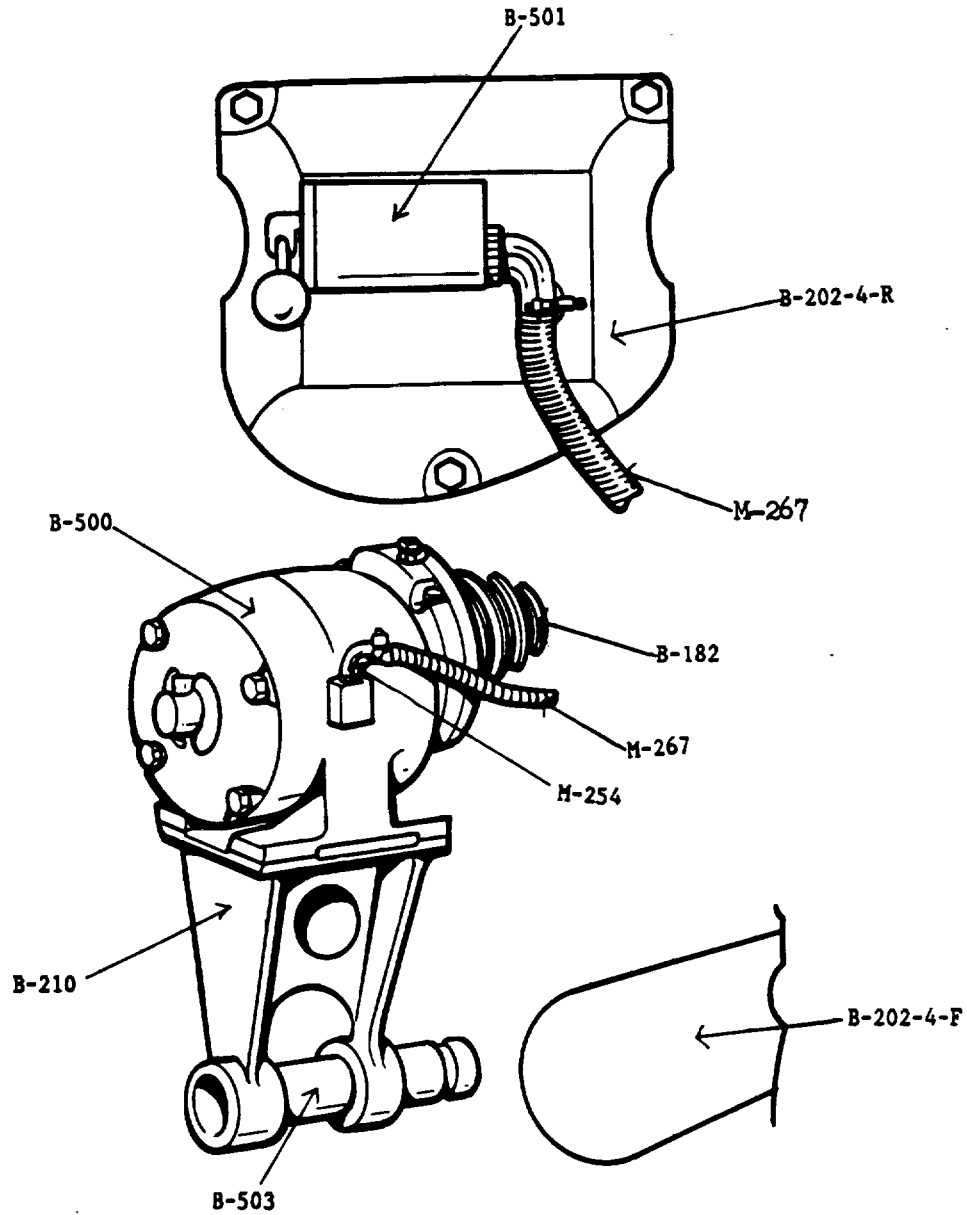
ONE INCH ARBOR



One Inch Arbor

B-102-C	One Inch arbor
M-200	Arbor nut
M-226	2 inch spacer collar
M-227	1 inch spacer collar
M-228	1/2 inch spacer collar

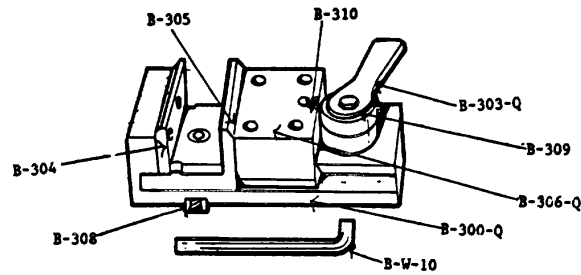
SWITCH, GUARD and MOTOR



Switch, Guard, and Motor

B-18Z	Motor Pulley
B-202-4-f	Spindle belt guard (front)
B-202-4-r	Spindle belt guard (rear)
B-210	Motor Mounting Bracket
M-254	900 Connector
M-267	Flexible Conduit
B-500	Motor
B-501	Drum type switch
B-503	Stud, motor bracket

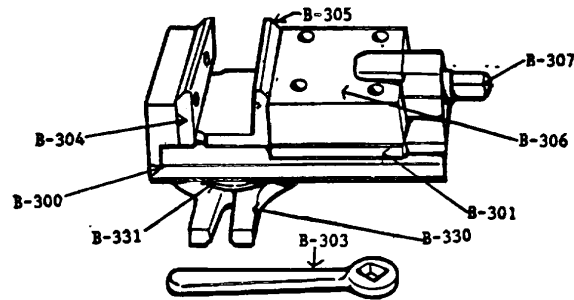
QUICK OPENING VISE



Quick Opening Vise

B-W-10	Wrench
B-300-Q	Vise Body
B-303-Q	Vise Handle
B-304	Jaw (Body)
B-305	Jaw (Slide)
B-306-Q	Slide
B-308	Tongue Strips
B-309	Handle Bushing
B-310	Link

PLAIN VISE and SWIVEL VISE

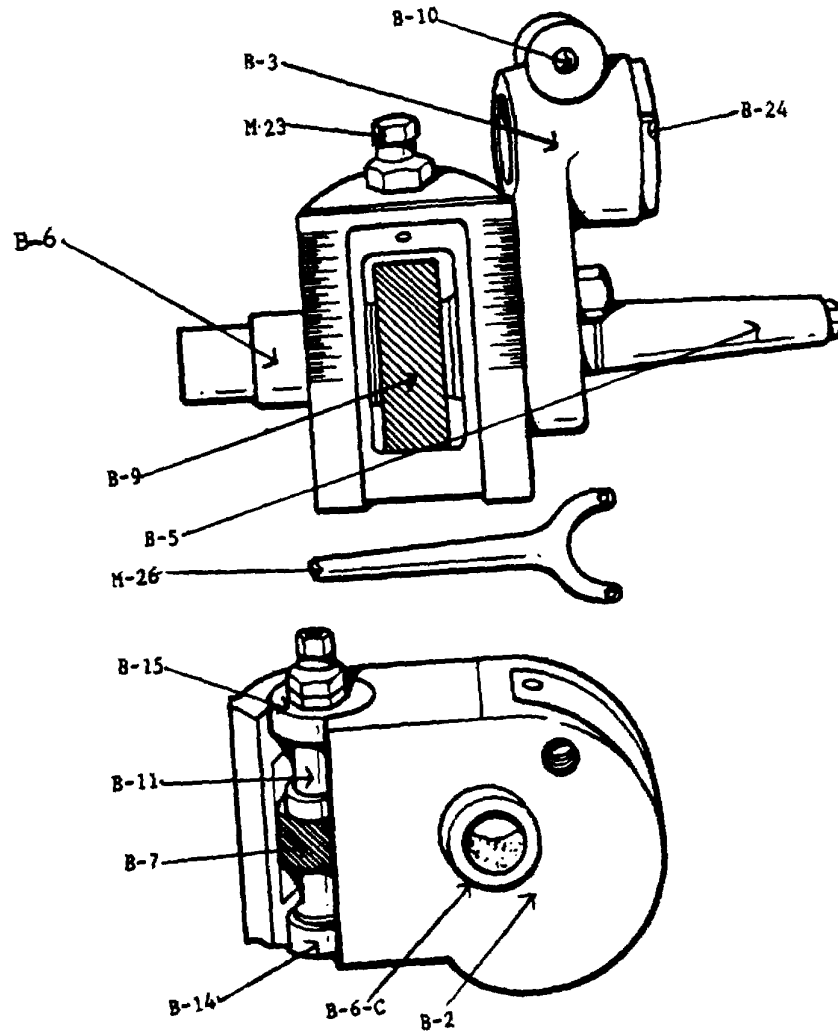


Plain Vise and Swivel Vise

B-300	Vise Body
B-301	Slide Clamps
B-303	Handle
B-304	Jaw (Body)
B-305	Jaw (Slide)
B-306	Slide
B-307	Screw
B-330	Swivel Base
B-331	Swivel Base Plug

Note: The swivel vise includes the plain vise assembly plus the swivel base and plug.

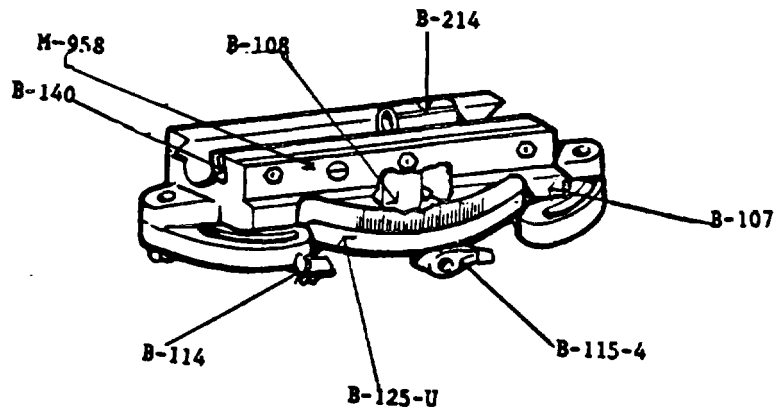
VERTICAL MILLING ATTACHMENT



Vertical Milling Attachment

- | | |
|--------|------------------------------|
| B-2 | Vertical Head Casting |
| B-3 | Adapter Plate |
| B-5 | Driving Arbor |
| B-6 | Bronze Bushing. |
| B-6-C | Steel Plate (2) |
| B-7 | Steel Pinion Gear |
| B-9 | Bronze Spiral Gear |
| B-10 | Binder Bolt |
| B-11 | Spindle |
| B-14 | Ball Bearings (Front) |
| B-15 | Ball Bearings (Rear) |
| B-23 | Draw-in Sleeve |
| B-24 | Eccentric Bushing |
| M-26 | Spanner Wrench |
| B-2841 | Ball Bearing (2) (Not shown) |

UNIVERSAL SADDLE FOR No. 4 MILLING MACHINE

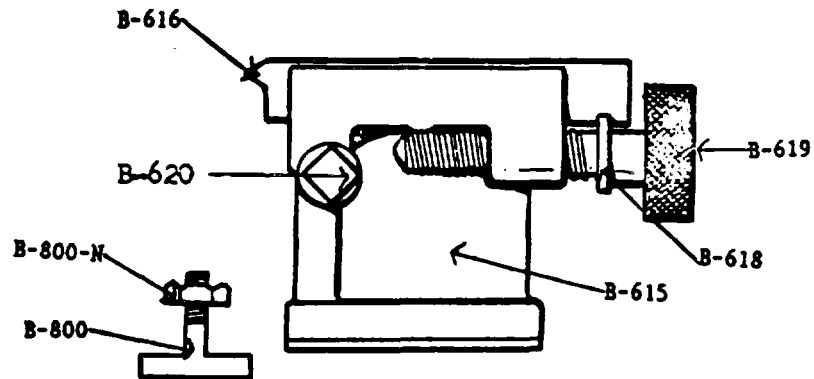


Universal Saddle for #4

Milling Machine

B-107	Swivel Plate
B-108	Swivel Stud
B-114	Saddle Gib
B-115-4	Cross Feed Nut
B-15-U	Universal Saddle
B-140	Table Gib
B-214	Table Feed Nut
M-958	Gib Locking Screw

TAILSTOCK for INDEXING CENTERS and DIVIDING HEAD



Tailstock for Indexing Centers and Dividing Head

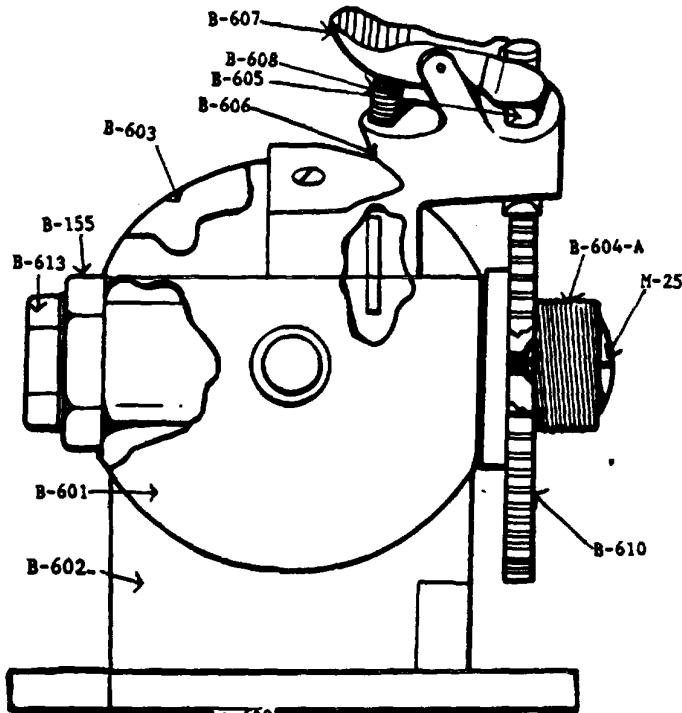
B-615	Tailstock
B-616	Tailstock Center
B-618	Tailstock Screw
B-619	Handwheel for Screw
B-620	Clamping Screw
B-800	T Slot Bolt
B-800-N	T Slot Bolt Nut

TILTING HEAD INDEX

CENTER WITH COLLET

SPINDLE

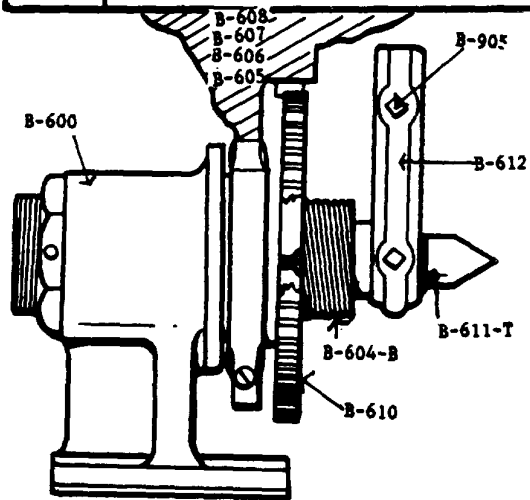
- M-25 1/2 inch Collet
- B-155 Spindle Adjusting Nut
- B-601 Tilting Head Index Center
- B-602 Body Bracket
- B-603 Back Plate
- B-604-A Collet Type Spindle
- B-605 Plunger Finger
- B-606 Plunger Bracket
- B-607 Pawl Lever
- B-608 Spring
- B-610 Index Plate
- B-613 Draw-in-Sleeve



STATIONARY HEAD

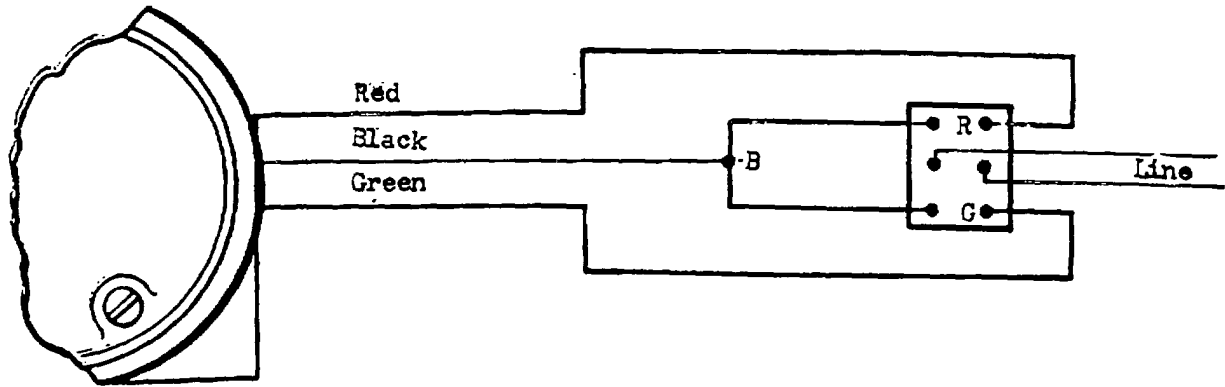
INDEX CENTER WITH

TAPERED SPINDLE

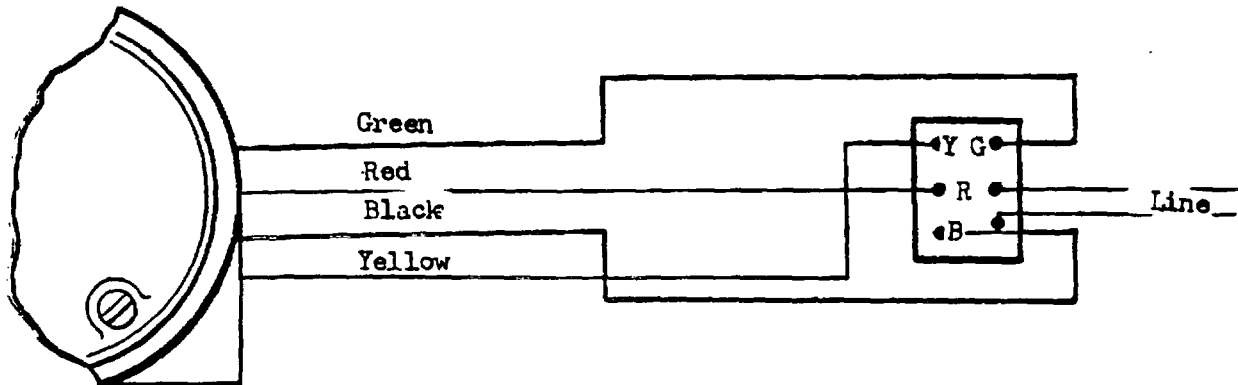


- B-600 Stationary Head Index Center
- B-604-B Tapered Type Spindle
- B-610 Index Plate
- B-611-T Tapered Center
- B-612 Driving Dog
- B-905 Set Screws

WIRING DIAGRAM - ELECTRICALLY REVERSIBLE GEARHEAD MOTORS



THREE LEAD MOTORS



FOUR LEAD MOTORS

PARTS LIST N6.4 MILLING MACHINE

less motor and electrical equipment

MATERIALS

C.I. = cast iron
 ALUM. = aluminum
 C.R.S = cold rolled steel
 COM. = purchased

<u>Req'd</u>	<u>Part No.</u>	<u>Name</u>
	UNIT-COLUMN ASSEMBLY	
1	B 100-4	Column (C.I.)
1	B 113	Stud. power feed arm (C.R.S.)
1	B 117	Spindle Pulley (C .I.)
1	B 118	Collar1 power feed stud arm (C.R.S.)
1	B 121-A or L	Power fed arm (with B 121-C bushing) (C.I.)
1	B 122-4	Spindle, #9 B & S Taper (alloy steel)
1	B 123	Pulley, power feed (die cast)
2	B 155-4	Spindle Adjusting Nuts (1-1/4"-20 Hex jam) (C.R.S.)
1	B 169-S or L	Bushing. spindle spacing (C.R.S.)
1	B 170 (SA)	Overarm Sub Assembly (C.R.S. & C.I.)
1	B 182	Motor Pulley (C.I. or aluminum)
1	B 20Z-4F	Guard. motor side (sheet metal)
1	B 202-4R	Guard, cast iron (C.I.)
1	B 209	Motor Bracket (C.I.)
1	B 210-A,B or C	Motor Frame (C.I.)
1	B 251	Oil Pan (C.1.)
1	B 503	Motor Stud (C.R.S.)
1	B 508	V Belt, Motor (#230-B) (COM.)
2	M 509	7/16" x 1-1/2" Hex Head Cap Screws (COM.)
1	M 513	5/16" x 3/4" Allen Set Screw (COM.)
5	M 517	3/8" x 1" Hex Head Cap Screws (COM.)
2	B 520	#11 Woodruff Keys (COM.)
2	M 523	1/8" Zerk Fittings 01610 (COM.)
1	B 525	11315 Cup, Timken (front) (COM.)
1	B 526	11157 Cone," " to (COM.)
1	M 527	19283 Cup, " (rear) (COM.)
1	M 528	19138 Cone, " " (COM.)
1	B 5Z9	Front Outside Seal (Fibre) (COM.)
1	B 530-4	Rear " " "(COM.)
2	B 531	Front Inside " "(COM.)
2	B 532	Rear " " "(COM.)
1	B 533-F	Oil Seal (Felt) (COM.)
1	B533-R	" " "(COM.)
2	B 534	" " "(COM.)
1	M 563	5/8" Cad Washer (COM.)
1	M 583	1/2" Hex Half Nut (COM.)
1	B 7Z0	Washer, fibre (COM.)
3	M 908	5/16" x 3/4" Hex Head Cap Screws (COM.)
1	M 928	5/8" x 2-3/4" Hex Head Cap Screws (COM.)
6	M 942	10/24" x 1/2" Round Head Machine Screws (COM.)
2	M 948	3/8" x 1/2" Allen Set Screws (COM.)
4	M 951	1/2" x 1" Hex Head Cap Screws (COM.)

UNIT-TABLE ASSEMBLY

1	B 126	Table (Specify size desired) (C.I.)
1	B 213	Table Feed Screw (Conforms to table length) (C.R.S.)
1	B 215	Ball Crank, 5" (COM.)
1	B 216	Bush, table feed (Brass)
1	B 218	Dial, " " (Graduated .100) (C.R.S.)
1	M 505	3/8" Hex Half Nut (COM.)
2	M 534	1/4" x 3/4" Fillister Head Cap Screws (COM.)
1	M 543	#8 Woodruff Key (COM.)
1	B 701-B	Universal Joint (COM.)
1	B 706-A	Gear Feed Box Sub Assembly (See SA)
1	B 707	Telescope Tube (C.R.S.)
1	B 708	Sleeve, pulley driven (C.R.S.)
2	B 720	3/4" I.D. x 1-5/16" O.D. Fibre Washers (COM.)
1	B 721-A	Pulley, power feed (die cast)
1	B 725-A or B(SA)	Throw Out Rod, power feed, (Sub Assembly) (see SA)
1	B 727-A or B	V Belt, power feed (Conforms to table length) (COM.)
3	M 913	10/24" x 1/4" Allen Set Screws (COM.)
3	M 939	1/4" x 1/4" " " (COM.)
2	M 963	#2 Woodruff Keys (COM.)

UNIT-KNEE ASSEMBLY

1	B 124-4	Knee (C.I.)
1	B 105	Thrust Bearing (COM.)
2	B 106 (SA)	Handwheel Sub Assembly (Graduated .100) (see S.A.)
1	B 115-4	Cross Feed Nut (Brass)
1	B 120-4	Cross Feed Bushing (Bronze)
1	B 128-4 (SA)	Vertical Feed Screw Sub Assembly (see S.A.)
1	B 129-4	Cross Feed Screw (C.R.S.)
1	B 130-4 (SA)	Vertical Feed Shaft Sub Assembly (see S.A.)
2	B 131	Cross Feed Screw Lock Nuts (5/8"-22 Hex Jam) (COM.)
1	B 141	Gib, Knee (C.I.)
1	B 152-4	Pinion gear, vertical feed (C.R.S.)
3	M 505	3/8" Hex Half Nuts (COM.)
3	M 507	3/8" Lock Washers (COM.)
2	M 543	#8 Woodruff Keys (COM.)
3	M 919	3/8" x 1-1/4" Hex Head Cap Screws (COM.)
2	M 939	1/4" x 1/4" Allen Set Screws (COM.)

UNIT-SADDLE ASSEMBLY

1	B 125-4	Saddle (C.I.)
3	B 104	Beveled Gib Pins (table) (COM.)
1	B 114	Gib, Saddle (C.I.)
1	B 140	Gib, Table (C.I.)
1	B 214	Nut, Table Feed (Bronze)
1	M 597	5/16" Hex Half Nut (COM.)
1	B 710	Cam, Power feed throw out (C.R.S.)
2	M 905	5/16" x 3/4" Fillister Head Cap Screws (COM.)
1	M 90.7	5/16" Square Head Set Screw (Cup Point) (COM.)
3	M 938	1/4" x 3/4" Allen Set Screws (COM.)
2	M 955	5/16" Lock Washers (COM.)

2	M 956	5/16" x 1" Hex Head Cap Screws (COM.)
3	M 957	1/4" Hex jam Nuts (Brass)
1	M 958.	1/4" x 1" Round Head Machine Screw (COM.)
1	M 959	1/4" x 1/2" Flat Head Machine Screw (COM.)
1	M 960	1/8" x 3/4" Straight Pin (COM.)

Sub Assemblies, for #4 Miller

Req'd Part No. Name

B 706 (SA) UNIT-POWER FEED ASSEMBLY

2	M 516	5/16" x 7/8" Fillister Head Cap Screws (COM.)
1	B 701	Universal Joint (1/2" Ream Both Ends) (C.R.S.)
1	B 702	Yoke, Power Feed (Bronze)
1	B 704	Steel Worm (C.R.S.)
1	B 705	Worm Gear, (Bronze)
1	B 706	Gear Box, Power Feed (ALUM.)
1	B 706-C	Cover, Gear Box (ALUM.)
1	B 709	Shaft, Telescope (C.R.S.)
1	B 713	Pawl, Power Feed (C.I.)
1	B 713-P	Plate, Pawl (C.R.S.)
1	B 715	Spring, Gear Box (Steel)
1	B 718	Stud, Yoke (C.R.S.)
1	B 719	Shaft, Worm (C.R.S.)
2	B 726	1/2" I.D. x 3/4" O.D. Fibre Washers (COM.)
3	M 913	10/24" x 1/4" Allen Set Screws (COM.)
4	M 942	10/24" x 1/2" Round Head Machine Screws (COM.)
1	M 962	10/24" Hex Half Nuts (Brass)
2	M 964	#2 x 3/4" Tapered Pins (COM.)

B 106 (SA) HANDWHEEL SUB ASSEMBLY

1	B 106	Handwheel (Graduates .100) (C.I.)
1	B 106-H	Handle, Handwheel (COM.)
1	M911	1/4" x 1/2" Allen Set Screw (COM.)

B 128-4 (SA) VERTICAL FEED SCREW SUB ASSEMBLY

1	B 119-4	Vertical Feed Nut (Bronze)
1	B 128-4	" " Screw (C.R.S.)
1	B 128-4C	" " Collar (C.R.S.)
1	M954	#3 x 1-1/4" Tapered Pin (COM.)

B 130-4 (SA) VERTICAL FEED SHAFT SUB ASSEMBLY

1	B 130-4	Vertical Feed Shaft (C.R.S.)
1	B 152-4	" " Pinion (C.R.S.)
1	M954	#3 x 1-1/4" Tapered Pin (COM.)

B 170 (SA) OVERARM SUB ASSEMBLY

1	B 112	Overarm Bracket (C.I.)
1	B 148	Center, Overarm Bracket (1/2" straight shank) (C.R.S.)
1	B 170	Overarm (C.R.S.)
1	M 948	3/8" x 1/2" Allen Set Screw (COM.)

B 725 (SA) TRIP ROD SUB ASSEMBLY

1	B 712	Trip Rod Collar (C.R.S.)
1	B 714	" " Spring (Steel)
2	B 722	" " Bearing Brackets (ALUM.)
2	B 723	" " Throw Outs (C.R.S.)
1	B 724	" " Finger (C.R.S.)
1	B 725-A or B	Trip Rod (C.R.S.)
2	M 939	1/4" x 1/4" Allen Set Screws (COM.)
4	M 960	1/8" x 3/4" Straight Pins (COM.)

Note: B725-A Trip Rod is for 16" table only
 8725-B Trip Rod is for 20" table only

When #B 77-D (28") Cabinet Column is required for any machine it includes the following parts:

1	B 77-D	Cabinet Column, 28" (C.I.)
1	B 101 (SA)	Column Door Sub Assembly (C.R.S.)
1	M 515	5/16" x 1/2" Thumb Screw (Parker Kalon)
4	M 551	1/2" Hex Full Nuts (COM.)
4	M 904	1/2" Lock Washers (COM.)
4	M 922	1/2" x 3" Hex Head Cap Screws (COM.)
1	M 955	5/16" Flat Washer (COM.)

#4 Universal Mill1vess motor and electrical equipment.

Req'd Part No. Name

Note: All parts are the same as a standard 04 Plain Miller except for, the following changes.

MINUS

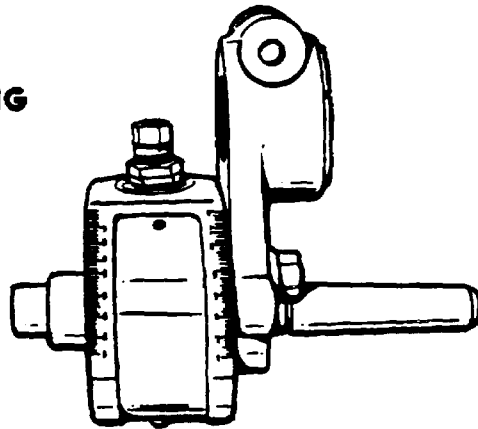
1	B 125-4	Saddle (C.I.)
1	B 701-A	Universal joint (C.R.S.)
1	B 708	Sleeve, pulley driven (C.R.S.)
1	B 721-A	Pulley, power feed (die cast)

PLUS THE FOLLOWING PARTS

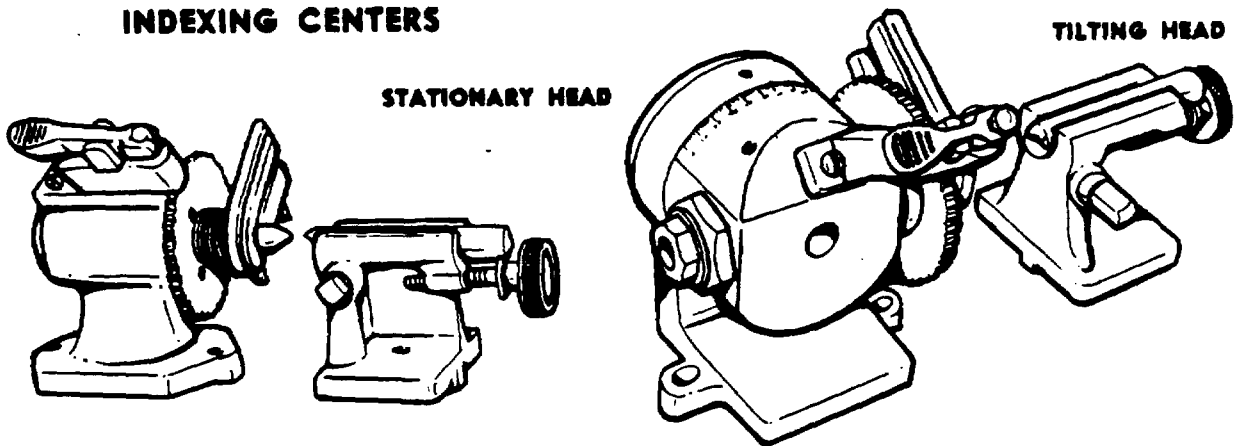
1	B 107	Plate, Swivel (C.I.)
1	B 108	Stud, Swivel (C.R.S.)
1	B 125-U	Saddle, Universal (C.I.)
1	B 701-U	Universal Joint (1/2" x 9/16" Ream) (C.R.S.)
1	B 708-U	Sleeve, pulley-driven (C.R.S.)
1	B 721-B	Pulley, Power Feed (die cast)
1	B 728	Shaft, Splined (C.R.S.)
2	M 921	1/2" x 1-1/2" Hex Head Cap Screws (COM.)
2	M 925	1/2" Cad Washers (Cr1.)

Attachments for MILLERS and other small Machine Tools

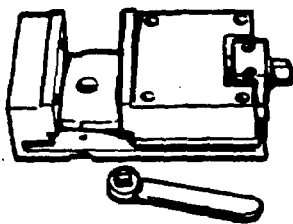
VERTICAL MILLING ATTACHMENT



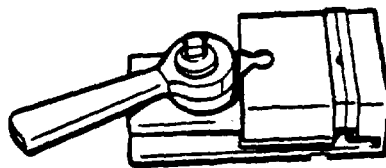
INDEXING CENTERS



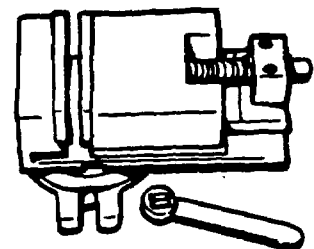
VICES



PLAIN VISE



QUICK OPENING VISE



GRADUATED SWIVEL VISE

Little in U.S.A.

By Order of the Secretary of the Army:

Official:

ROBERT M. JOYCE
Brigadier General, United States Army
The Adjutant General

E. C. MEYER
General, United States Army
Chief of Staff

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