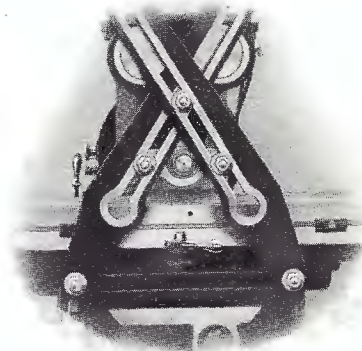


**"MILWAUKEE"
THE DOUBLE
OVER ARM
MILLER**

**PLAIN
MILLING
MACHINES**



NO. OF MACHINE	No. 2A	No. 2B	No. 3 B	NO. OF MACHINE	No. 2A	No. 2B	No. 3B
Table feed—automatic.....	30"	30"	36"	Number of feed changes.....	12	12	12
Cross feed—automatic on B type.....	10"	10"	12"	Range of feed (in inches per minute).....	½ to 16	½ to 16	½ to 16
Vertical feed—automatic on B type....	19"	19"	20"	Diameter of driving pulley.....	16"	16"	16"
Working surface of table.....	47"x13"	47"x13"	55"x15"	Width of driving belt.....	4½"	4½"	5"
Over-arm.....	Double	Double	Double	Speed of driving pulley (R.P.M.).....	300	300	350
Number of arbor supports.....	2	2	3	H. P. of motor for electric drive.....	5	5	7½
Center of spindle to over-arm.....	6½"	6½"	7⅞"	Net weight (in pounds) about.....	4500	4600	6600
B. & S. taper hole in spindle.....	No. 11	No. 11	No. 12	Shipping weight (domestic) about.....	4800	4900	7100
Width of vise jaws.....	7¼"	7¼"	8¼"	Shipping weight (foreign) about.....	5300	5400	7600
Depth of vise jaws.....	2"	2"	2¼"	Number of boxes (foreign).....	1	1	1
Vise opens without steel jaws.....	6¼"	6¼"	7¼"	Cubic feet (foreign) about.....	104	104	147
Number of speed changes.....	18	18	18	Code word.....	Endeavor	Envoy	Energy
Range of speed (R. P. M.).....	15-360	15-360	13-320				

Equipment:—Vise, belt guard, oil pump for lubricating cutters and necessary wrenches.

MANUFACTURED BY **Northern Machinery Co.,**
KEARNEY & TRECKER CO. 503 5th St. So.,
 MILWAUKEE, WIS., U. S. A. Minneapolis, Minn.

MILWAUKEE MILLING MACHINES

NO. 2A MFG.

NO. 2B PLAIN

NO. 3B PLAIN

THE DOUBLE OVER ARM construction as provided on these machines is quite clearly shown by the half-tone engravings. It consists of two steel bars arranged accurately parallel with the spindle and at sufficient distance apart to form a rigid truss when the arbor bearings are clamped to them. This provides a means of positively aligning the cutter arbor, the usual practice having been for the arbor to align the bearings. The rigidity of this construction is such that large, coarse pitch cutters on rough, heavy work can be used at a much greater distance from the face of the column than has hitherto been practicable, making it possible to mill certain classes of work that otherwise could not be handled to advantage.

THE ARM BRACES that are supplied have been designed light and simple so as to be easily applied. All that is needed with this construction is a light tie to check synchronized vibration between the arbor bearings and the knee. If these braces are made heavy and cumbersome the tendency of the operator is not to use them.

THE WORK TABLE is made of semi-steel and is finished all over, both top and bottom, as experience has shown that where the scale is left on one side the table does not long retain its accuracy. The T-slots are deep and the metal under the center slot is unusually thick. Thorough arrangements are made to catch the lubricant used on the cutters and return it through the screened pockets at the ends and telescopic tubing to the reservoir in the base of the machine.

THE BOX SECTION KNEE has no slot through the top to close when under pressure from the saddle clamps or the strain of the cut. This knee construction is a fitting companion for the double over arm and when combined with the heavy box section frame and the light over arm braces an ideal unit is formed that is both convenient and rigid.

THE FLANGED SPINDLE used is an important improvement over the ordinary threaded end as it provides means for holding cutters for driving in either direction and the clutch collar keyed to the face of this spindle provides an ideal drive for the arbors, these arbors being tapped and held in the spindle by a draw-in rod, this same rod also being used to force the arbors out.

THE SPINDLE IS REVERSED by means self-contained within the machine so that right or left hand cutters can be used or the machine set up to run in either direction that proves to be most advantageous.

THE DRIVE is through a single pulley running at constant speed and protected by a belt guard so constructed that it can be adjusted to any angle. This guard is approved by safety experts everywhere.

THE SPINDLE SPEEDS are eighteen in number, providing a speed range from the largest cutters that will clear the over arm down to very small size end milling cutters. These changes are in geometrical progression in increments of about 20 per cent.

THE LUBRICATING SYSTEM consists of a reservoir in the base of the machine holding several gallons of machine oil that is pumped to the top of the machine where it is distributed by a perforated pipe to all gears and bearings, cascading downward over all of these on its way back to the reservoir. Where oil grooves, in ordinary construction,

are stopped short of the ends of the bearings to hold oil, in these machines they are cut clear through so that the oil will flow through them rapidly and wash away any foreign substance that otherwise might cause heating and cutting.

A CUTTER LUBRICATING PUMP is provided on every machine whether so ordered or not as practically every milling machine sooner or later finds its way on to steel or other material requiring lubricant and the life of the milling cutter is greatly prolonged and its efficiency enhanced by a liberal use of lubricant to wash away chips and keep it cool. Careful provision has been made for the return of the lubricant to the reservoir as indicated when referring to the work table.

No. 2A MANUFACTURING MILLER, in the main, is the same as the B type machines. The principal difference is in the knee and saddle. No cross or vertical feed is supplied on the A type and it is arranged with special reference to quick handling for quantity work.

ATTACHMENTS:—A full line of attachments are manufactured for these machines and can be supplied at any time. These consist of the following:—

Motor Drive	Universal Milling	Slotting
Right Angle Drive	Plain Centers	Cutters
Vertical Spindle	Universal Centers	Cutter Arbors
Rack Cutting	Spiral Universal	Collets, etc.
Rotary Table	Centers	

U. S. PATENTS

- Feb. 9, 1904—Box section knee without slotted top.
 - Oct. 23, 1906—Automatic lubrication.
 - June 13, 1911—Cutter lubricant return.
 - Mar. 12, 1912—Spindle drive gearing.
 - Feb. 18, 1913—Flanged spindle.
 - Feb. 18, 1913—Double over arm.
 - June 24, 1913—Vertical spindle head lubrication.
- Other patents pending.

