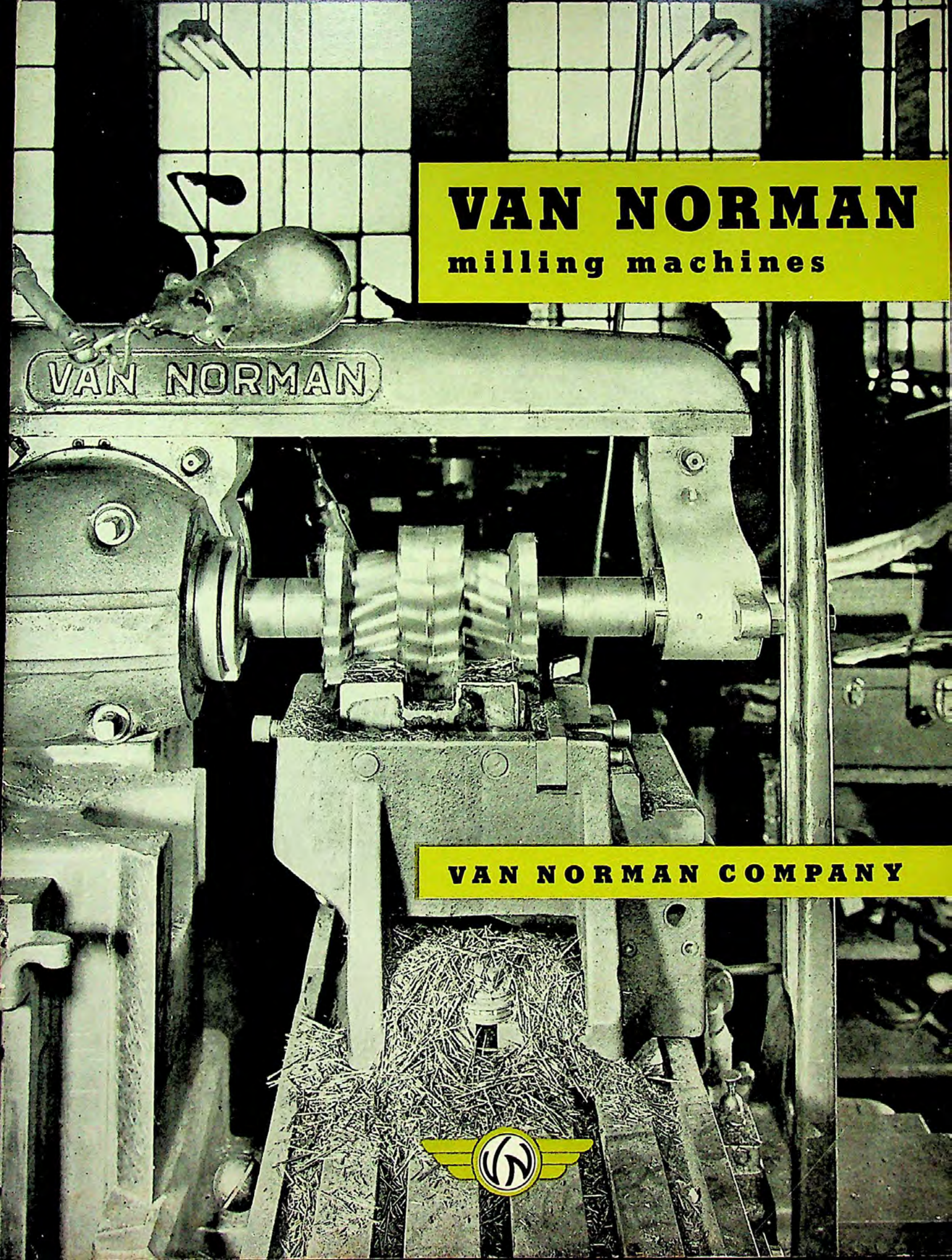
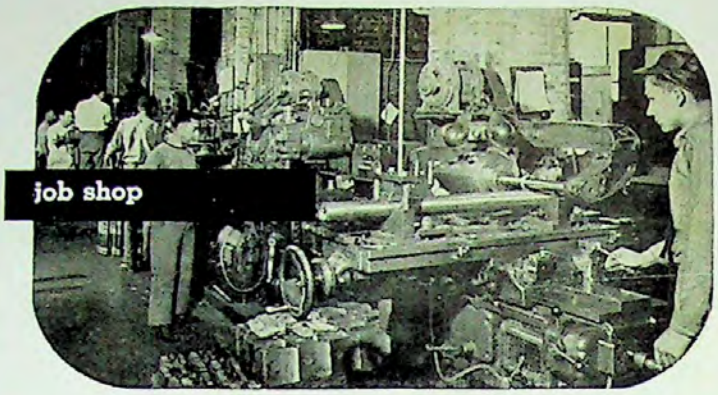


VAN NORMAN

milling machines

VAN NORMAN COMPANY


production


job shop

the place of Van Norman Milling Machines in modern industry

Ever since Van Norman introduced its first milling machine in 1890, quality and precision performance has been the keynote of every Van Norman product. Throughout the 68 years of its existence the company has steadily grown until today it enjoys the enviable position as one of the largest manufacturers of milling machines, oscillating radius grinders and automotive and aircraft service equipment.

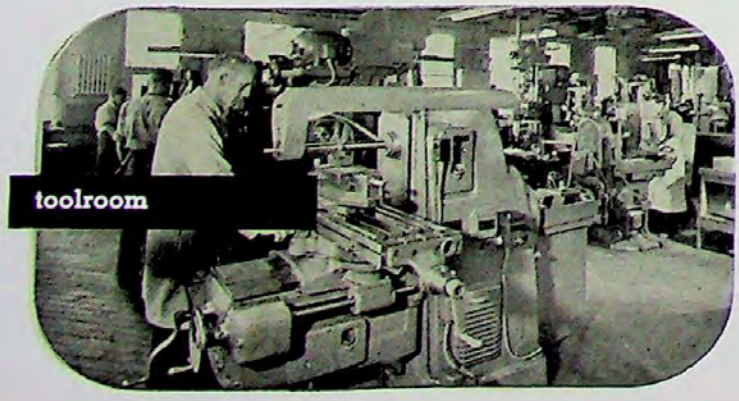
Its line of Ram-type millers . . . which permit horizontal, angular and vertical milling all on one machine . . . and new knee-type horizontals, have and are today making outstanding contributions to industry by speeding production and cutting costs in milling departments and tool rooms in every type of plant.

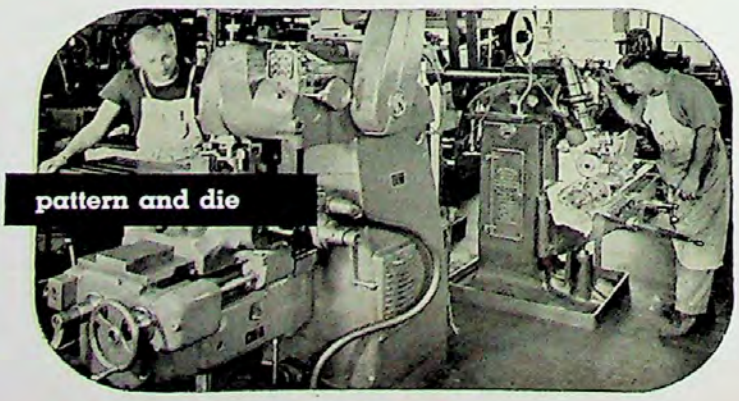
Van Norman Oscillating Grinders are known the world over for the speed and accuracy with which they finish ball races and other spherical surfaces. Today, more ball races are ground on Van Norman Grinders than on any other machine.

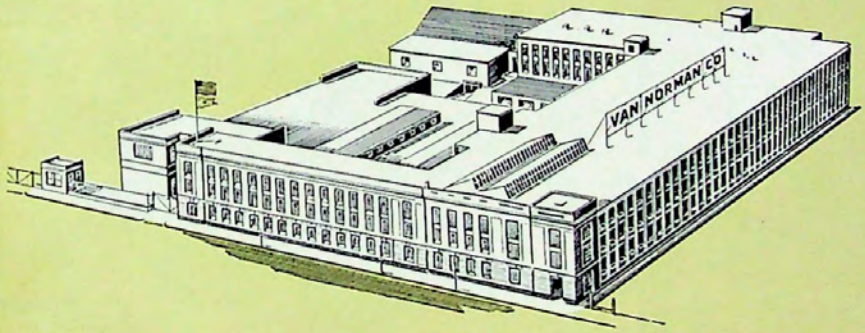
Its automotive equipment — boring bars, brake drum lathes, crankshaft regrinders and other service equipment tools—play an important part in keeping automobiles, trucks, tractors and aircraft in constant repair.

Today and in the coming years Van Norman machine tools will continue to be a vital part of industry. Its engineering and development facilities will offer new machine tools, and make continual improvements on present models.

In fact, no effort will be spared to make Van Norman machine tools the finest that can be produced, and the acceptance accorded them by large and small machinery, aircraft, automotive, ball bearing and marine manufacturers is evidence of the soundness of this company's policy.


toolroom


pattern and die



in this catalog:

To facilitate the selection of the correct milling machine for each specific combination of requirements, Van Norman engineers have prepared this quick digest of Van Norman products. The sections of this catalog are designated by letter for ease in use.

VAN NORMAN COMPANY
SPRINGFIELD 7, MASSACHUSETTS, U. S. A.

important advantages of Van Norman ram-type milling machines

The advantage of Van Norman Ram-Type Millers is their versatility to meet the daily fluctuating milling requirements in the toolroom, machine shop, experimental laboratory, and pattern shop—by enabling operators to perform *horizontal, angular,* or *vertical* milling using conventional milling practice and standard arbors and cutters . . . all with one machine.

The adjustable cutterhead, which is mounted on a movable ram, permits milling at any angle from horizontal to vertical *without* changing the work setup. This means that most jobs can be carried through to completion in the original setup. The result: idle operator and machine time is cut by as much as 50% since there is no waiting for single purpose machines . . . no moving of work from one machine to another . . . errors that usually occur in changing setup are eliminated because the work setup is not disturbed.

The versatility of ram-type millers to meet daily milling needs is also important in those plants and departments where milling requirements continually change. For example – one period calls for all horizontal milling, the next vertical or angular, or some horizontal, some vertical, etc. With ram-type millers operators simply position adjustable cutterheads, set up the work, and proceed with the milling job.

Ram-type millers enable you to meet all milling jobs . . . keep all operators and machines working. They cut costs, improve accuracy, and increase production.

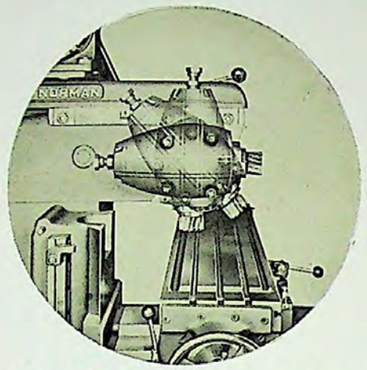
special features

Van Norman Ram-Type Millers embody many new engineering improvements that assure faster, easier, more accurate operation which reduces milling costs and increases profits. The *adjustable cutterhead,* mounted on a movable ram, permits horizontal, angular, or vertical milling, giving you the work range of several types of millers. Cutterhead is graduated in degrees for ease of setup. The face is machined to take attachments.

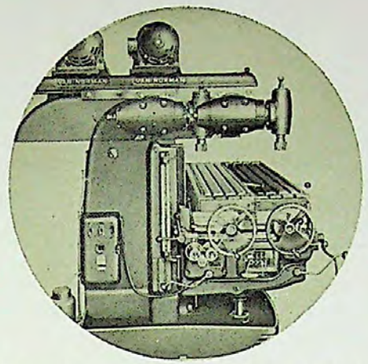
Movable ram, large and heavy, provides accuracy under all types of cuts. The combination of movable ram, adjustable cutterhead, and saddle crossfeed provides greater milling capacity.

Front and rear directional control of all power feeds and six-way rapid traverse on models 36, 26, 22L provide complete visibility of the cutting operation from front and rear positions . . . eliminates back-and-forth operator motion . . . reduces worker fatigue. Heavy duty gear transmissions, rugged column, large knee, and massive streamlined cutterhead assure power and rigidity. Large graduated dials provide ease of setting up work. Automatic lubrication, anti-friction bearings, multi-splined shafts, and large diameter feed screws assure long life.

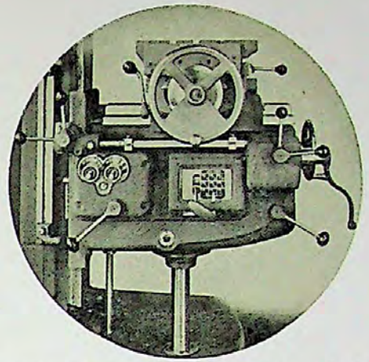
versatility



Adjustable cutterhead permits vertical, horizontal or angular milling, all on one Van Norman Ram-Type Miller . . . gives the work range of several single-purpose machines.

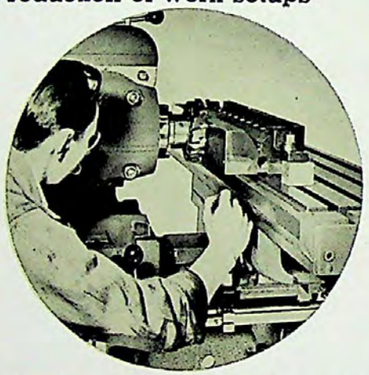


Adjustable cutterhead and movable ram in combination with the saddle crossfeed provide maximum milling capacity and versatility.

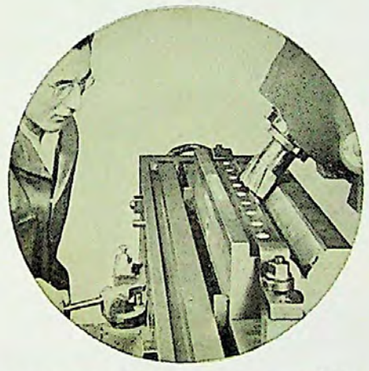


Front and rear control of hand and power feeds give complete visibility and control of operations from either location. Reduces worker fatigue . . . improves work accuracy.

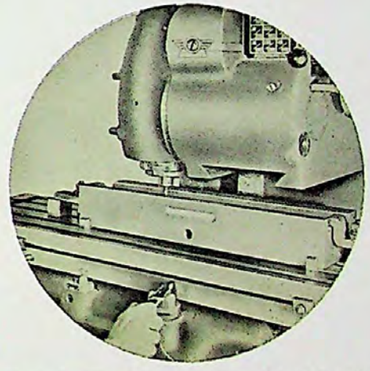
reduction of work setups



Horizontal milling • With adjustable cutterhead locked in horizontal position and the work set up, the operator uses rear controls and starts the job with a face milling operation.



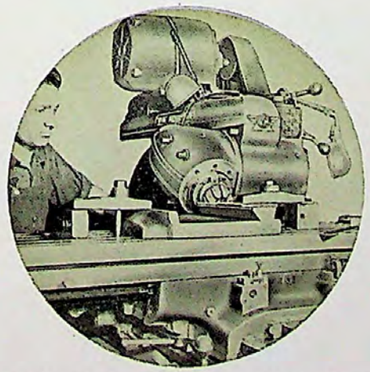
Angular milling • Here a V is being milled. Note that only the position of the cutterhead has been changed; workpiece is still in original position.



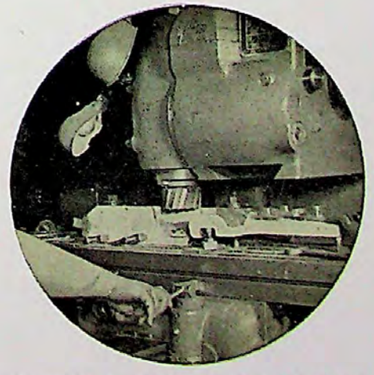
Vertical milling • Operator completes job with recess milling operation, using front controls. One work setup with simple changes in versatile cutterhead completes most jobs.

adaptability

Horizontal setup for boring and facing operation. The ram-type overarm with dovetail ways and outer support assures rigidity and accuracy.



With head locked in angular position the operator is taking an angular cut and operates the miller with the rear directional controls.



The ram-type miller used with adjustable cutterhead in the vertical milling position . . . operator using front directional controls.

8 standard models
Van Norman Ram-Type Millers are available in eight standard models . . . a size to meet practically every requirement for heavy, medium or light work.

special models
Models no. 36, no. 26 and no. 22L are available with higher columns which provide greater distance between center of spindle and top of table. For special applications, such as pattern and die work, requiring greater vertical range than available on standard models.

plain or universal saddle
Models no. 36, no. 26 and no. 22L can be furnished with either plain or swivel-type saddle.

The universal saddle has been provided with an exceptionally large bearing surface and side supports to assure maximum rigidity regardless of angle of swivel. Three convenient clamps lock the swivel members in any desired position. Two screws are provided for locking the table in zero location. The table can be swiveled 45° to the left and 35° to the right. The angular position is indicated by graduations on the lower member.

Van Norman

ram-types
no. 36 and no. 26

no. 36 table size: 58 x 13 in.
no. 26 table size: 50 x 12 in.

adjustable cutterhead

No matter what the milling requirement from horizontal to angular . . . you simply position the swiveling cutterhead and proceed with the work, using standard arbors and cutters and conventional milling practice.

power feed controls

Front and rear *directional* control of all power feeds . . . knee, saddle, table, including 6-way rapid traverse . . . provides extreme ease of control and reduces worker fatigue. The control levers are actuated *in the direction of movement* desired.

hand feeds

***Front* and *rear* manual feeds enable the operator to line up the work from either postion . . . eliminate back and forth steps.**

single lever feed selector

The exclusive Van Norman feed selector provides quick selection of 18 feeds from ⅜ to 32 in. by merely moving selector up or down and right or left to desired feed as indicated by pointer on direct-reading dial.

speed change selector

Convenient spindle speed change unit in front of the ram provides quick speed changes by means of two levers with "high" and "low" series obtained by a push-pull knob. 18 speeds from 30 to 1500 rpm are instantly available.

ram movement

19 in. in and out over column provides greater work milling capacity.

column and base • Massive column and base provides solid rigidity for ram and knee. Long, broad ways on top and front of column assure secure holding of ram and knee units.

movable ram • The ram, on which the adjustable cutterhead is mounted, is large and heavy, providing accuracy under all cutting conditions. The movable ram permits the throat distance to be varied in or out so that the spindle is more closely coupled to the column for maximum rigidity . . . increases work range.

ram-type overarm • New and improved. It is 50 in. long with dovetail bearings on the ram overarm ways . . . permits use of shorter arbors for horizontal milling operations assuring exceptionally rigid arbor support.

cutter spindle and transmission • Heavy duty large diameter spindle is hardened and ground for accuracy and long life. It is mounted on Timken double-opposed bearings on front and roller bearing on back. Nose is fitted with no. 50 National standard taper of 3½ in. per foot. Self-lubricated transmission has heavy hardened gears of alloy steel on multi-splined shafts running on taper roller bearings.

feed transmission • Contained in knee, it is operated through vertical multi-splined drive shaft. Gears are alloy steel, heat-treated, and operate on anti-friction bearings. Automatic lubrication assures an adequate supply of oil to all moving parts.

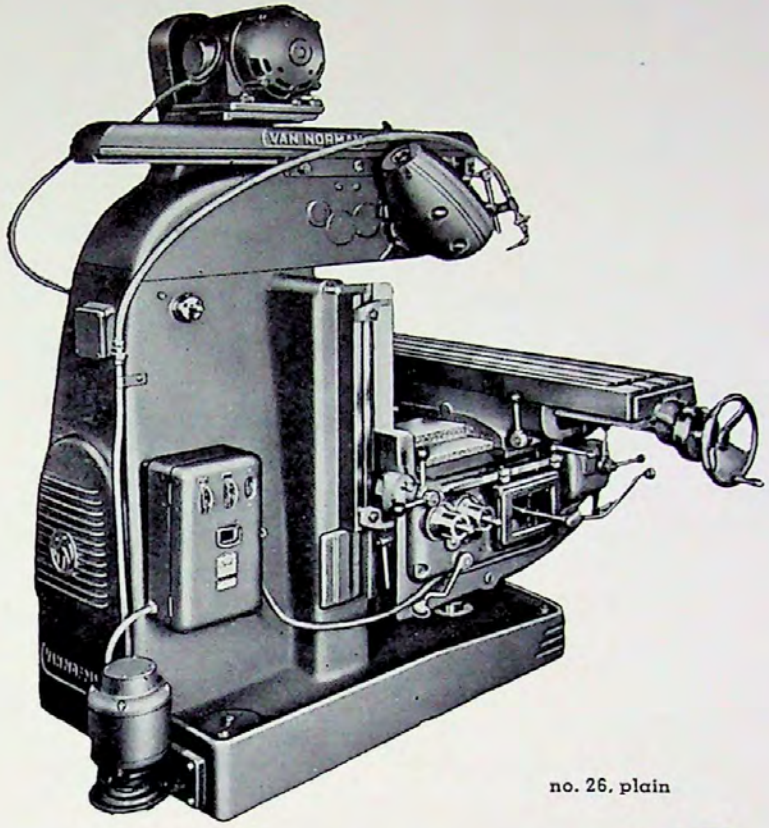
knee • Massive in size to provide the greatest support for saddle with square way with taper gib. Ample bearing support for carrying knee on column is obtained with V-ways and double-angle wedge-type gibbing locked by gib clamps operated by a single lever. Feed stops are provided.

saddle, plain and universal • Have large bearing surfaces providing adequate support for the table. One-shot lubrication unit provides simplified oiling of table, knee ways and saddle mechanism.

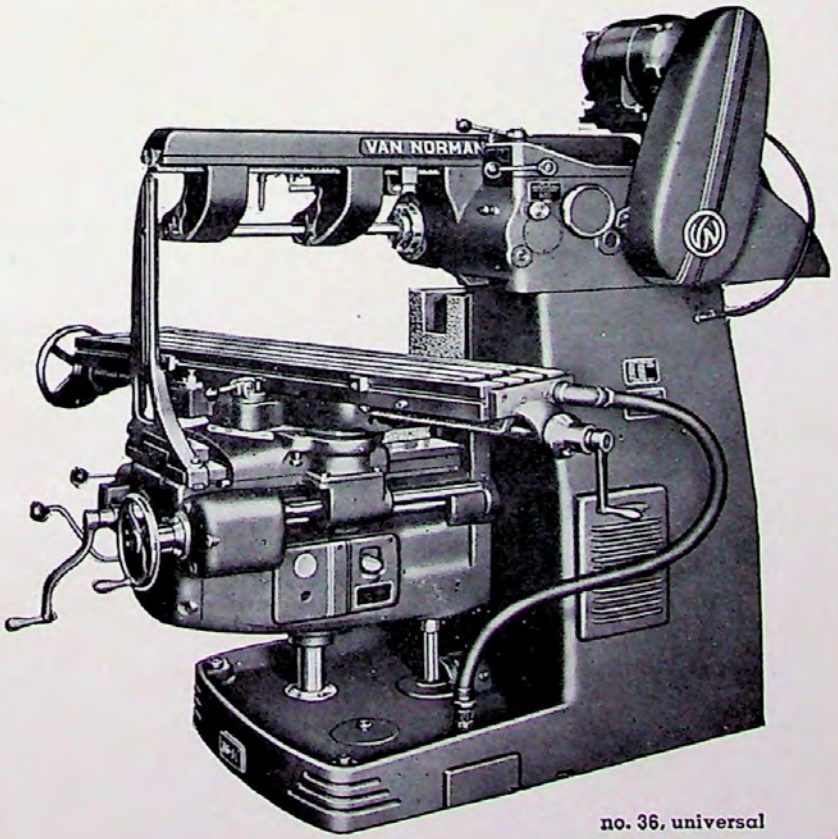
table • Is a heavy, close-grained, semi-steel casting having three T-slots. The T-slot in front carries the adjustable table stops. Permanent safety stops are secured to lower front face of the table. Table feed screw with multi- splined key way is 1¾ in. in diameter.

Van Norman

a ram type milling machines



no. 26, plain



no. 36, universal

	no. 26	no. 36
table		
working surface	50 x 12 in.	58 x 13 in.
longitudinal feed	28 in.	35 in.
saddle, crossfeed	12 in.	12 in.
knee		
vertical	19 in. max.*	22¼ in. max.*
center line of spindle, horizontal position — *pl.*	19 in.	21¾ in.
center line of spindle, horizontal position — *univ.*	17½ in.	20¼ in.
nose of cutterhead, top of table, vertical position — *pl.*	13¼ in.	16 in.
nose of cutterhead, top of table, vertical position — *univ.*	11¾ in.	14½ in.
face of column to C/L of spindle	12 in.	12 in.
ram, movement over column	19 in.	19 in.
overarm		
length	50 in.	50 in.
cutter clearance	5¾ in.	5¾ in.
cutterhead, graduated adjustment	90°	90°
spindle, National standard taper	no. 50	no. 50
diameter hole through spindle	1½ in.	1½ in.
number of speeds	18	18
speeds	30 to 1500 rpm	30 to 1500 rpm
feeds		
number of feeds	18	18
feed rates per minute:		
longitudinal	3/8 to 32 in.	3/8 to 32 in.
cross	5/32 to 24 in.	5/32 to 24 in.
vertical	3/16 to 16 in.	3/16 to 16 in.
rapid traverse, power		
feed rates per minute:		
longitudinal	100 in.	100 in.
cross	75 in.	75 in.
vertical	50 in.	50 in.
coolant reservoir capacity	8 gal.	8 gal.
motors, 1725 rpm, 60 cycle		
cutter spindle	3 hp	5 hp
feed	2 hp	2 hp
dimensions		
base	48 x 30 in.	48 x 30 in.
floor area	102 x 86 in.	117 x 86 in.
floor to C/L spindle	52½ in.	59 in.
machine boxed	84 x 70 x 76 in.	84 x 77 x 80 in.
weight, net approx.		
plain	5200 lb.	5800 lb.
universal	5300 lb.	5900 lb.
for crated weight, add	*600 lb.*	*600 lb.*
for boxed weight, add	*1100 lb.*	*1250 lb.*

standard equipment

set of wrenches; pulleys, guard and belts for cutter spindle drive; chain and sprockets for feed motor drive; standard taper adapter for Van Norman No. 2 collet; draw-in bar; 7/8 in. collet; pilot type arbor support, style B arbor support, and outer brace. (main drive, feed motor and all controls not included.)

design and specifications subject to change without notice

* *special models are available with higher columns, providing greater vertical range.*

Van Norman

ram-types
no. 22M and no. 22L

no. 22M table size: 50 x 10 in.
no. 22L table size: 45 x 10 in.

cutterhead

New, improved, adjustable cutterhead meets daily fluctuating milling needs . . . horizontal to vertical. Minimizes work resetups . . . eliminates idle machine time by as much as 50%.

front and rear directional controls

All power feed controls, as well as six-way rapid traverse, are located at front and rear of machine . . . and operate in the direction of the desired table, saddle or knee movement. They enable the operator to perform milling operations from front and rear—saving steps, time.

hand feeds

Cross and vertical feed cranks are located on front of knee. Large dials, graduated in degrees, assure accuracy in setting up the work.

feed selector

Twelve feed changes from .5 to 36 in. are selected easily by the Van Norman Rotary Feed Selector located on the front of the knee and "high-low" series lever on the side of knee.

spindle speed selector

Nine speed changes from 40 to 1100 rpm are made quickly by two convenient levers located on the front of the ram.

ram movement

19 in. in and out over column . . . increases work capacity . . . enables the operator to couple the spindle more closely to the column. Ram bearing on column is 19 in., assuring solid rigidity in any position.

column and base • Provides rigid support for the ram and knee units. Binders solidly lock the ram unit in any position. Feed motor and feed drive unit are enclosed in column. Adequate ventilation is assured through fin-type louvers. Base contains the coolant tank of seven-gallon capacity.

movable ram • The large and heavy ram has long, broad ways, assuring maximum rigidity. It has an entirely self-lubricated gear transmission for driving the cutterhead spindle.

overarm • A large diameter, solid steel overarm for the arbor support is located on the upper part of the ram. Positive locks are located at front and rear of ram.

cutter spindle and transmission • The heavy spindle is mounted on Timken bearings front and rear with convenient adjustment for correct preload. Spindle nose can be furnished for no. 13 B&S taper or no. 40 National standard taper. Hand wheel permits turning the spindle manually. Spindle transmission gears are of hardened alloy steel mounted on multi-splined shafts rotating on taper roller bearings for strength, quietness and long life. Gears and bearings are lubricated by a constant splash of oil sealed within the ram.

feed transmission • Contained in the knee, it provides twelve feed changes. Gears and shafts are of hardened alloy steel mounted on anti-friction bearings. All moving parts are automatically lubricated.

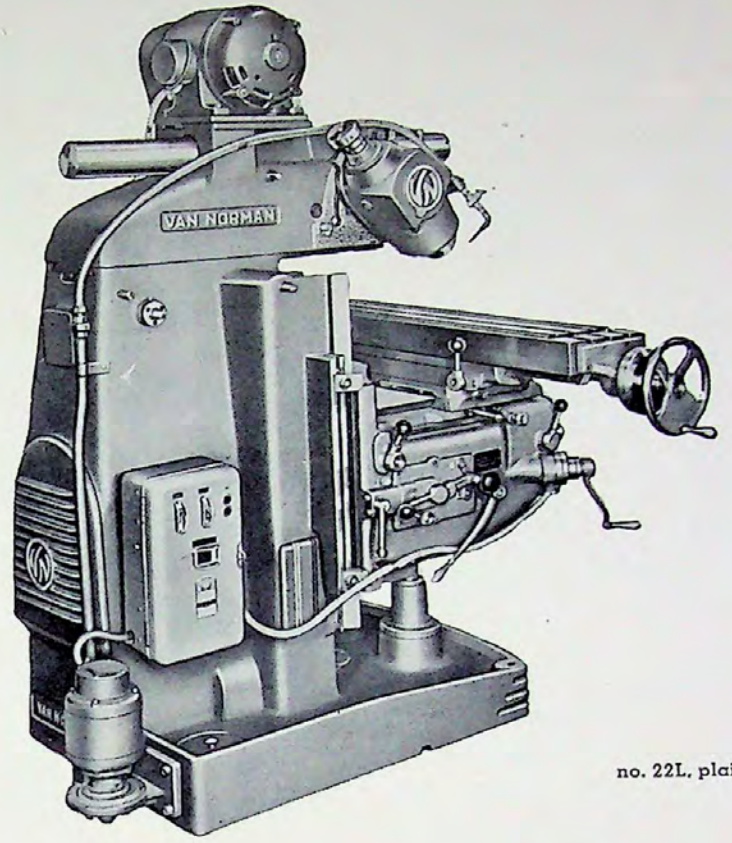
knee • The knee is large in size with ample supports for knee bearing on column and saddle bearing on knee . . . assures rigidity for heavy cuts and accuracy. All parts within the knee are automatically lubricated from enclosed oil reservoir.

saddle • It is correctly proportioned to assure proper support for table. Lubrication of all moving parts, as well as table and saddle ways, is simplified by a one-shot system that distributes the correct amount of lubricant to the various parts through metering valves.

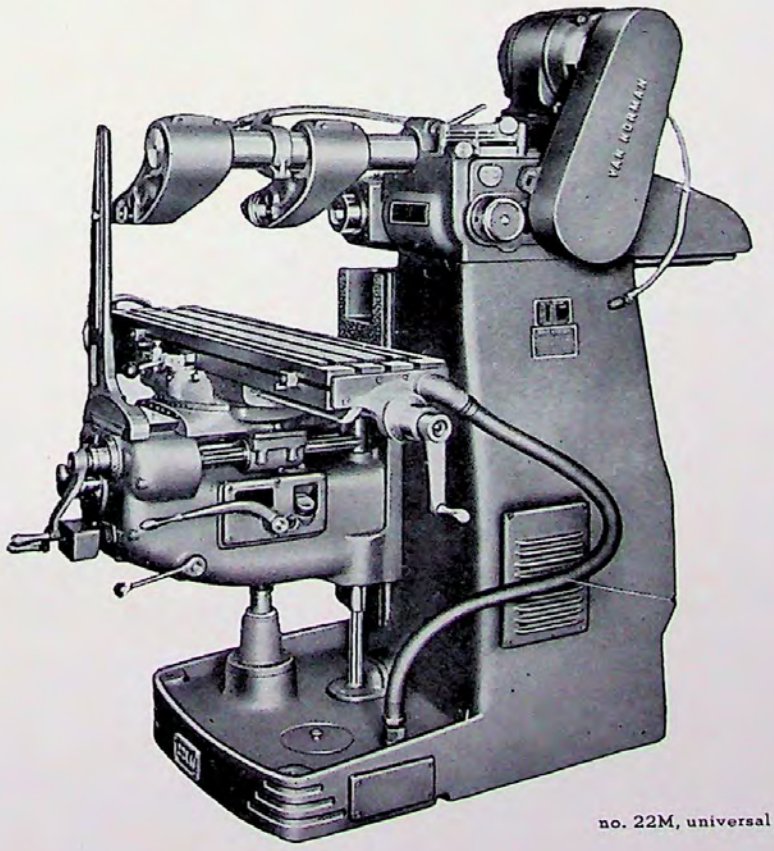
table • Designed for maximum strength, it is made of close-grained, semi-steel casting. It has three T-slots for holding workpiece. The front of the table has a T-slot for adjustable stops.

Van Norman

a ram type milling machines



no. 22L, plain



no. 22M, universal

	no. 22M	no. 22L
table		
working surface	50 x 10 in.	45 x 10 in.
longitudinal feed	28 in.	28 in.
saddle, crossfeed	10 in.	10 in.
knee		
vertical	20 in.	17 in.
center line of spindle, horizontal position — *pl.*	21 in.	18 in.
center line of spindle, horizontal position — *univ.*	20¼ in.	17¼ in.
nose of cutter head, top of table, vertical position — *pl.*	15⁵⁄₁₆ in.	12⁵⁄₁₆ in.
nose of cutter head, top of table, vertical position — *univ.*	14⁵⁄₁₆ in.	11⁵⁄₁₆ in.
face of column to C/L of spindle	12 in.	12 in.
ram, movement over column	19 in.	19 in.
overarm		
length	41 in.	41 in.
cutter clearance	5¾ in.	5¾ in.
cutterhead, graduated adjustment	90°	90°
spindle, Brown & Sharpe taper,	no. 13	no. 13
optional: National standard taper	no. 40	no. 40
diameter hole through spindle	1½ in.	1½ in.
number of speeds	9	9
speeds	40 to 1100 rpm	40 to 1100 rpm
feeds		
number of feeds	12	12
feed rates per minute:		
longitudinal	.5 to 22 in.	.5 to 22 in.
cross	.5 to 36 in.	.5 to 36 in.
vertical	.3 to 36 in.	.3 to 36 in.
rapid traverse, power feed rates per minute		
longitudinal	130 in.	130 in.
cross	130 in.	130 in.
vertical	75 in.	75 in.
coolant reservoir capacity	7 gal.	7 gal.
motors, 1140 rpm, 60 cycle		
cutter spindle	3 hp	2 hp
feed	1½ hp	1½ hp
dimensions		
base	27 x 40 in.	27 x 40 in.
floor area	98 x 72 in.	93 x 72 in.
floor to C/L of spindle	58¼ in.	48¾ in.
machine boxed	72 x 69 x 75 in.	72 x 69 x 69 in.
weight, net approx.		
plain	3650 lb.	3400 lb.
universal	3750 lb.	3500 lb.
for crated weight, add	*825 lb.*	*800 lb.*
for boxed weight, add	*1450 lb.*	*1400 lb.*

standard equipment

set of wrenches; pulleys, guard and belts for cutter spindle drive; chain and sprockets for feed motor drive; standard taper adapter for Van Norman No. 2 collet; draw-in bar; ⅞ in. collet; pilot type arbor support, style B arbor support, and outer brace. (main drive, feed motor and all controls not included. collet adapter furnished as extra for no. 40 National standard taper spindle.)

special models are available with higher columns, providing greater vertical range.

design and specifications subject to change without notice

Van Norman

ram-types
no. 12 and no. 6

no. 12 table size: 37½ x 9 3/16 in.
no. 6 table size: 30 x 6⅞ in.

Ram-type models no. 12 and no. 6 offer facility for exceptionally wide range of milling applications, particularly on smaller work commonly encountered in the production department, toolroom, experimental laboratory and repair shop. They are extremely versatile, accurate, and convenient to operate.

adjustable cutterhead

Permits horizontal, angular and vertical milling with one machine . . . provides the work range of several single-purpose machines. The cutterhead is graduated in degrees for ease of setup.

controls

The no. 12 and no. 6 Millers are easy to operate. Dials have graduations in thousandths for quick, accurate adjustments. Control handles are placed for easy and convenient operation throughout the entire working range.

ram

Ram movement in and out on column increases the work range of the machines . . . permits the throat distance to be varied so that the spindle may be more closely coupled to the column . . . provides maximum rigidity . . . assures cutting accuracy.

speeds

Nine speed changes through gears on no. 12 are obtained by two levers on front of ram. On no. 6 model sliding gears and 3-step pulley controlled by quick-change shift levers provide nine speed changes.

feeds

No. 12 has twelve table feeds from ⅜ to 14 in. selected through feed transmission accessible from right or left of machine.
No. 6 has hand feeds throughout.

column and base • Sturdy, rugged column and base is generously ribbed on the inside to add strength and rigidity. The highest grade of close-grained, semi-steel castings are used to assure strength and permit a very fine finish on all machined and scraped surfaces. Base of no. 12 contains coolant reservoir.

sliding ram • On which the cutterhead is mounted is large and rugged. Ram movement in and out over column is 12¾ in. on the no. 12; and 9½ in. on the no. 6. It increases the versatility of the machines . . . enables operators to handle larger work.

overarm • Bar type overarm, 2⅜ in. in diameter, provides rigid support for horizontal milling operations and attachments.

cutter spindle and transmission • Hardened spindle, mounted on Timken bearings, is hollow throughout its length to take a draw-in bar. The spindle nose is ground to fit standard Van Norman arbors and chucks. All transmission gears are of hardened alloy steel mounted on taper roller bearing shafts. Constant lubrication of gears is assured by a bath of oil in which they run.

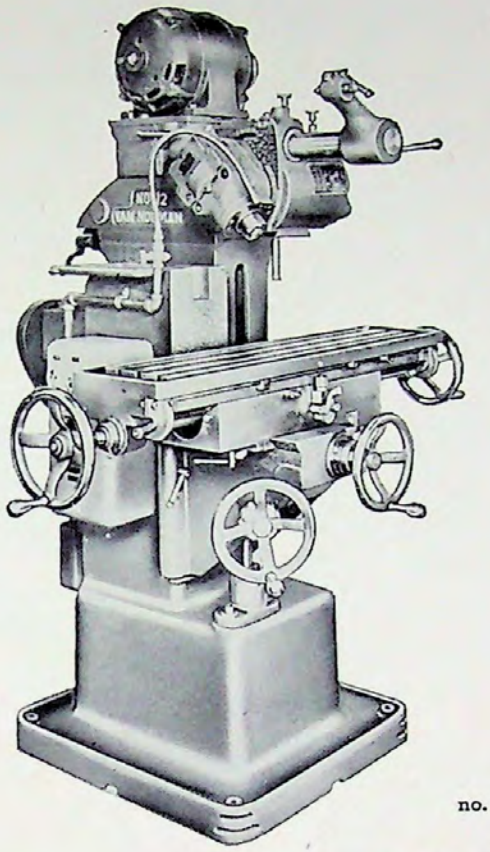
knee • The box-type construction of the knee is large, permitting maximum rigidity. Hand wheels and large, easy-to-read dials, graduated in thousandths for knee and saddle are mounted in front.

saddle • The rugged saddle has large bearing surface providing adequate support for the table. The no. 12 saddle contains the table feed screw operating mechanism. A positive sliding jaw clutch, operated by a simple and exclusive reversing and stop mechanism, controls the feed of the table, either by hand or automatically.

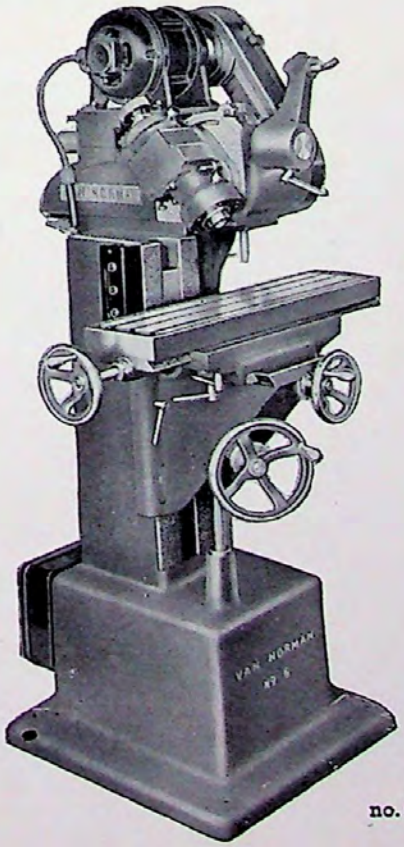
table • The tables with three T-slots are supported on generously built ways. No. 12 table is provided with longitudinal power feed and has provision for coolant return to reservoir in base.

Van Norman

a ram type milling machines



no. 12



no. 6

	no. 12	no. 6
table		
working surface	32½ x 9⅜ in.	26¾ x 6⅞ in.
longitudinal feed	17 in. power	18 in. hand
saddle, crossfeed (hand)	6⅝ in.	5¾ in.
knee, vertical (hand)	17 in.	16¼ in.
C/L of spindle, horizontal position to table	17 in.	16¼ in.
nose of cutter head to table, vertical position	12⅛ in.	12 in.
maximum throat distance, head vertical position	7 in.	6½ in.
ram, movement over column	12¾ in.	9½ in.
cutterhead, graduated adjustment	90°	90°
spindle, VN collets, style	C	C
9 speeds	70 to 1465 rpm	80 to 1450 rpm
feeds		
number of feeds	12	hand
feed rates per minute	⅜ to 14 in.	hand
profile stud, distance C/L of spindle, vertical position, to C/L of profile stud	6½ in.	6½ in.
coolant reservoir capacity	6½ gal.	
motors, 60 cycle		
cutter spindle, 1140 rpm	1½ hp	1 hp
feed, 1725 rpm	¼ hp	
dimensions		
base	25 x 29 in.	23¾x25¾ in.
floor area	71 x 56 in.	60x44 in.
floor to C/L of spindle	51 in.	49 in.
weight, net approximate	1900 lb.	1350 lb.
for crated weight, add	*400 lb.*	*335 lb.*
for boxed weight, add	*600 lb.*	*425 lb.*

standard equipment

main drive motor plate, pulleys, belts and belt guard, feed motor chain and sprockets (no. 12 only), draw-in bar, wrenches, one collet, 5-in. vise with swivel base, profile stud. (motors not included.)

design and specifications subject to change without notice

advantages of Van Norman horizontal milling machines

The new Van Norman Horizontal Milling Machines offer many developments and engineering features that make definite important contributions to faster, easier, and more accurate milling operation.

Every phase of modern engineering and design is emphasized in the construction of these new models. Adequate factors of safety have been applied to all units to provide maximum strength and rigidity. Controls are at the finger tips of the operator. These and other improvements increase the convenience of operation, reduce overall work completion time, offer the user greater opportunities to reduce milling costs and increase profits on general purpose and production milling applications.

special features

front and rear directional controls • No matter whether the operator is at the front or rear of the machine, all power operating controls are right at his finger tips. These controls are directional and are actuated in the direction of the desired table, saddle or knee movement.

hand wheels and cranks • Crossfeed hand wheel, vertical hand crank, table hand wheel, and table hand crank release automatically when not in use. Dials are large and legible, graduated in thousandths. Rear hand adjustment is provided on larger models.

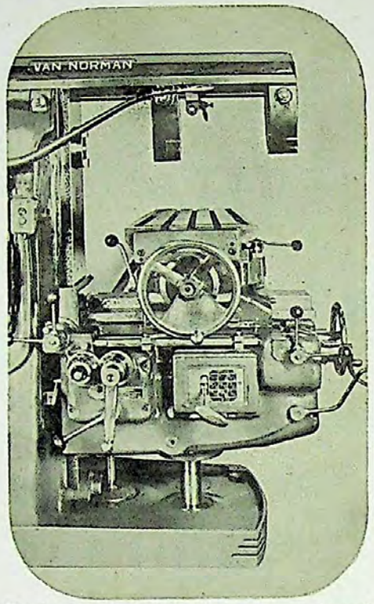
knee, saddle and table • The knee designs are massive and rugged with ample bearing surface on the columns to assure rigidity. The new saddles and tables are larger and heavier providing maximum work holding capacity.

column • The new columns are heavy and massive. Added strength and rigidity are assured by scientific ribbing placed at the proper sections on the inside of the column and base.

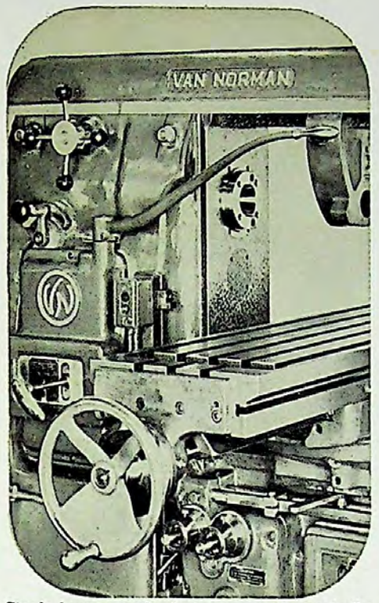
spindle transmission • The entire spindle transmission units are of new design. They have wider faced gears with greater tooth area for strength and quietness of operation. All gears and shafts, operating on taper roller bearings, are of alloy steel, hardened to minimize wear and insure long life.

other features • Safety devices are provided in the knee design to eliminate strain on any unit of the mechanism should any feed overload occur. Conveniently located speed and feed change selectors provide instantaneous control with minimum of effort. Spindle clutch levers can be instantly adjusted to the position most convenient for operation from front or rear of machine. Most models have a pilot wheel for quick, easy adjustment of the ram-type overarm. Automatic lubrication, antifriction bearings, multi-splined shafts, and large diameter feed screws assure long life, accurate performance.

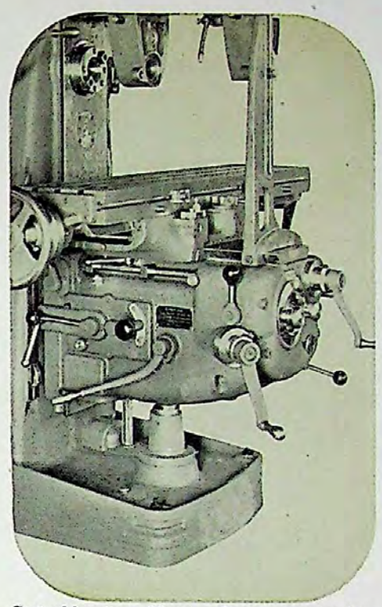
special features



Front and rear directional power controls and hand feeds on models no. 3 standard and no. 2 heavy are at operator's finger tips . . . exclusive Van Norman single lever feed selector is reached easily from either operating position.

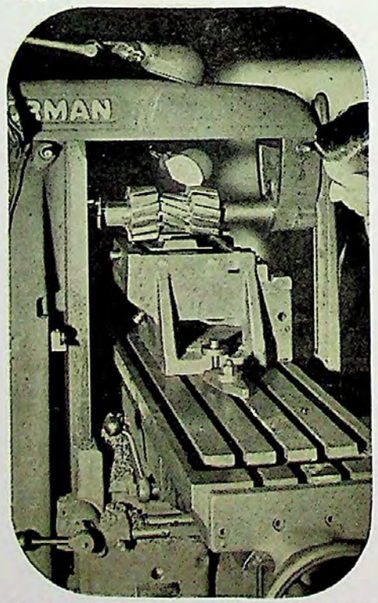


Single lever speed selector, convenient spindle reverse, adjustable spindle clutch lever, pilot wheel for adjusting ram-type overarm (on all models except no. 2 light) provide convenient control . . . increase production.

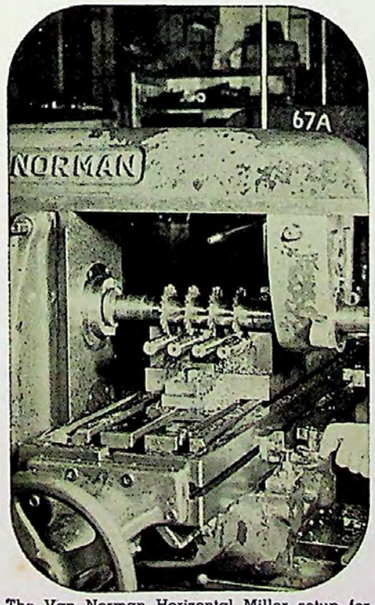


Central location of front and rear operating levers with positive directional control . . . fast selection of feeds . . . adjustable spindle clutch lever—all give ease of operation of no. 2 medium and no. 2 light duty millers.

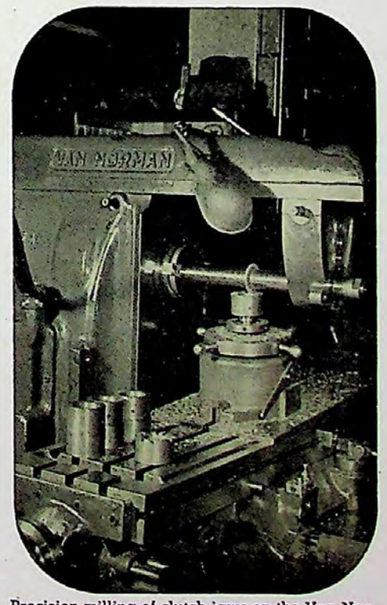
applications



The typical gang milling operation is being performed on the Van Norman Horizontal Miller. The exceptionally rigid construction assures maximum accuracy under every type of cut.



The Van Norman Horizontal Miller setup for multiple milling of key slots. Using the front directional controls, the operator has complete visibility of the cut.



Precision milling of clutch jaws on the Van Norman Horizontal Miller. An indexing fixture is used for positioning the work for each cut.

8 standard models

Van Norman Horizontal Millers are available in four sizes—in plain and universal models to meet practically all milling requirements for production, toolroom, and general purpose work.

plain or universal saddle

All sizes of horizontal milling machines can be furnished with either plain or swiveling saddle.

The universal saddle has an exceptionally large bearing surface and side support to assure maximum rigidity regardless of angle or swivel. Three convenient clamps lock the swivel members in any desired position. Two screws are provided for locking the table in zero location. The table can be swiveled 45° to the left and 45° to the right. The angular position is indicated by graduations on lower member.

Van Norman

horizontals
no. 3 standard
no. 2 heavy

no. 3 standard table size: 64 x 14 in.
no. 2 heavy table size: 58 x 13 in.
motor: 7½ hp

The new Van Norman Horizontal Milling Machines are especially designed for a wide range of production milling. Many new features have been added to make definite important contributions to faster, easier and more accurate operation. These machines are unusually compact, with exceptional rigidity and dependability, assuring smooth operation on the heaviest cuts. These millers have a large flywheel mounted on the back of the spindle within the column for smoother cuts.

front and rear directional controls

Power feed controls of the saddle, knee and table are located in both the front and rear of the machine. The control levers are actuated in the direction of the movement desired, adding to operator's safety. Hand feeds are also located in front and rear of machine. Dual controls, for power and hand feeds, simplify operation . . . provide complete visibility of the setup and cutting operation . . . minimize worker fatigue.

feed selector

The exclusive Van Norman single lever feed selector, on side of knee, is reached easily from either front or rear operating position. It enables the operator to select quickly any one of 18 feeds from ⅜ to 32 in.

exclusive Van Norman speed selector

Eighteen speed changes from 25 to 1250 rpm in geometric progression are selected instantly by means of the exclusive Van Norman single lever selector located on the side of the column.

flywheel

Built-in spindle flywheel plus heavy bull gear improves cutability. Five anti-friction bearings provide maximum spindle rigidity.

column and base • The new improved column and base is wider, heavier, with improved ribbing assuring maximum rigidity. Top of column is machined to receive massive ram-type overarm which is accurately and securely locked with double cam-type clamps.

ram-type overarm • Heavy overarm has dovetail ways bearing on the top of column, locked front and rear. The sturdy arbor supports, for B style arbors, are clamped to the underside of the overarm by cam-type locks. These supports are equipped with oil reservoirs which simplify arbor lubrication. Convenient pilot wheel provides ease in overarm adjustment.

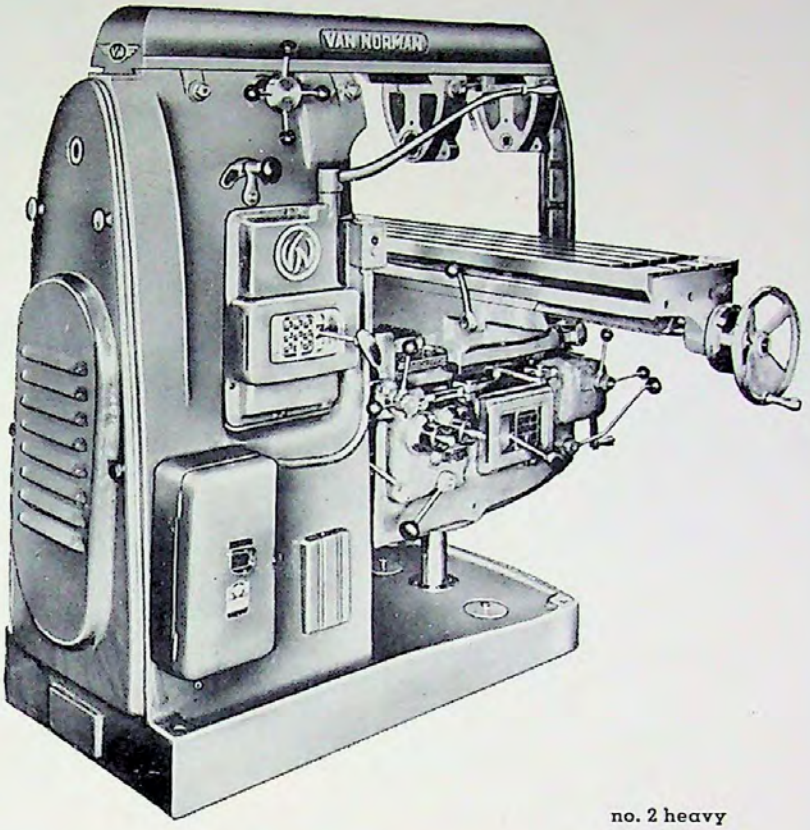
cutter spindle and transmission • The modern alloy steel forged spindle has a no. 50 National standard taper nose. Large, double-opposed Timken bearings at front, double Timken in center, and straight roller bearing in rear assure positive rigidity. Front bearings carry both thrust and radial loads and are located as far forward as possible to provide for minimum overhang. The new improved spindle transmission has wider face gears with large tooth area. Gears are of hardened alloy steel operating on taper roller bearings. A large flywheel assures uniform cutting operation.

feed transmission • All gears of the feed transmission are of hardened alloy steel. Multi-splined shafts operate on anti-friction bearings throughout. Automatic lubrication assures trouble-free operation.

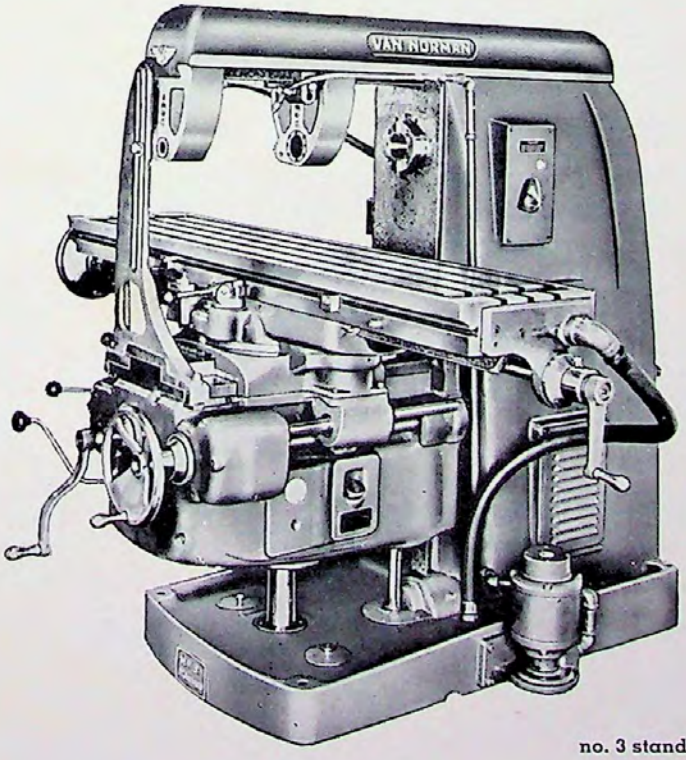
knee • The massive knee contains the entire feed change transmission unit. Double-angle, wedge-type gibbing, solidly locked by a single lever gib clamp, provides ample bearing surface for carrying the knee on the column. Saddle bearing has square ways with taper gib adjustments assuring rigid support for the saddle.

saddle • The heavy duty saddle is generously proportioned to assure adequate support for the table. The universal saddle has been designed carefully to provide an exceptionally broad surface of support between the saddle and swivel member. Graduations on the lower member indicate angular setting of the table which can be swiveled 45° to either side.

table • The table is of deep cross section and is operated by 1¾ in. feed screw with multi-splined key way. Permanent stops are positively secured to the lower front face of the table. Large graduated dials in thousandths provide ease of hand adjustment.



no. 2 heavy
plain



no. 3 standard
universal

		no. 2 heavy	no. 3 standard
table			
working surface		58 x 13 in.	64 x 14 in.
longitudinal feed		28 in.	34 in.
saddle, crossfeed		10 in.	12 in.
knee			
vertical feed		17 in.	17 in.
maximum distance from C/L of spindle to top of table in lowest position	*pl.*	17 in.	17 in.
	univ.	15½ in.	15½ in.
overarm			
length		52 in.	52 in.
cutter clearance		6¼ in.	6¼ in.
spindle, National std. taper		no. 50	no. 50
number of speeds		18	18
speeds		30 to 1500 rpm	25 to 1250 rpm
feeds			
number of feeds		18	18
feed rates per minute:			
longitudinal		3/8 to 32 in.	3/8 to 32 in.
cross		9/32 to 24 in.	9/32 to 24 in.
vertical		3/16 to 16 in.	3/16 to 16 in.
rapid traverse, power feed rates per minute:			
longitudinal		100 in.	100 in.
cross		75 in.	75 in.
vertical		50 in.	50 in.
coolant reservoir capacity		10 gal.	10 gal.
motor for drive, 1725 rpm		7½ hp	7½ hp
dimensions			
base		28 x 50¼ in.	28 x 50¼ in.
floor area		107 x 75½ in.	119 x 72½ in.
height of machine from floor to C/L of spindle		50 in.	50 in.
machine boxed		80 x 77 x 73 in.	80 x 83 x 73 in.
weight of machine without motor, including standard equipment			
net (approx.)	*pl.*	6000 lb.	6100 lb.
	univ.	6100 lb.	6200 lb.
crated (approx.)	*pl.*	6600 lb.	6800 lb.
	univ.	6700 lb.	6900 lb.
boxed (approx.)	*pl.*	7100 lb.	7300 lb.
	univ.	7200 lb.	7400 lb.

standard equipment

set of wrenches, pulleys and belts, 2 style B arbor supports for 2⅛ sleeve (no. 2 heavy 1 style B and 1 style A support hole size 23/32 in.), outer brace, draw-in bar, coolant system. (motor and control not included.)

design and specifications subject to change without notice

Van Norman

horizontals
no. 2 medium
no. 2 light

no. 2 medium table size: 50 x 10 in.
motor: 5 hp
no. 2 light table size: 45 x 10 in.
motor: 3 hp

These new ultra-modern horizontal milling machines are designed for production milling of medium size and smaller parts. They combine rugged strength with utmost accuracy and extreme sensitivity of operation and control.

directional controls

Power feeds are operated by levers located at both front and rear of the machine. Operated in the direction of the desired movement, they provide finger-tip control.

manual feed controls

Hand wheels and cranks for table, saddle and knee adjustments release automatically when not in use. Large dials provide convenient reading of graduations.

single lever speed selector

An exclusive Van Norman advantage, the single lever speed selector provides instant facility for selecting 18 speed changes from 30 to 1500 rpm in geometric progression.

rotary feed selector

Located on the front of the knee, the Van Norman rotary feed selector provides 12 feed changes from .5 to 36 in. in combination with a "high-low" lever contained on the left side of the knee.

overarm pilot wheel

Located on the side of the column, it permits quick, easy positioning of the heavy overarm.

flywheel

Heavy spindle flywheel with bull gear increases cutability of the no. 2 medium—assures smooth, uniform transmission of power to the cutter.

column and base • The column is designed in a unit with the base, generously proportioned to give rigid support to the heavy duty spindle, spindle transmission, and knee. Top of column is machined to receive the massive ram-type overarm. Base contains coolant tank and has provision for mounting the independent motor operated coolant pump.

spindle transmission • Located within the column, the spindle transmission has been designed carefully to provide extra strength for heavy duty milling. Large precision gears with greater tooth area are made of hardened alloy steel. Multi-splined shafts rotate on taper roller bearings. The alloy forged steel spindle has a no. 50 National standard taper nose. It is mounted on large double-opposed Timken bearings in front and straight roller bearing in rear. Front bearings carry both thrust and radial loads. *Large flywheel* is mounted directly behind the bull gear . . . provides even, smooth cuts.

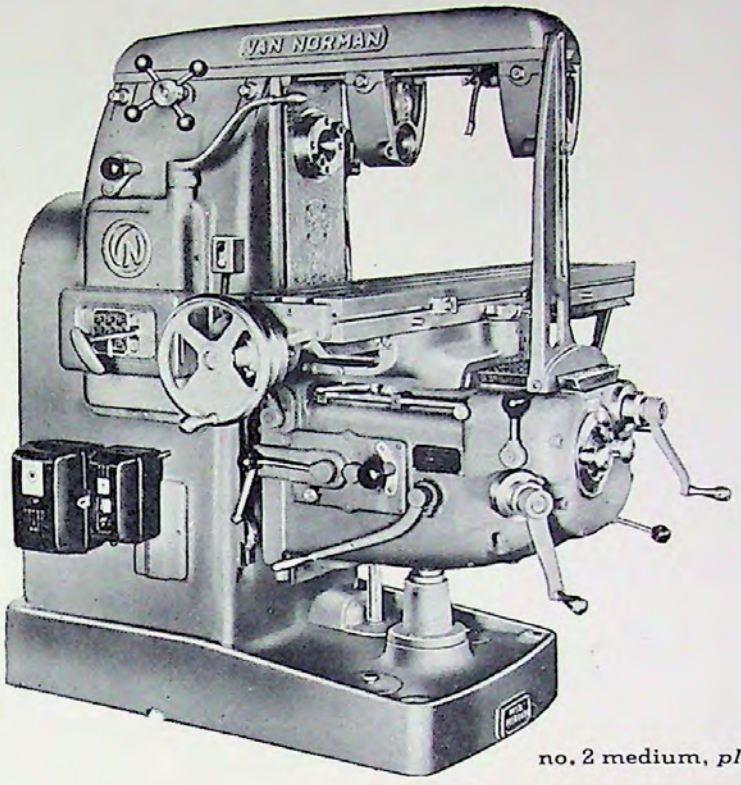
ram-type overarm • The overarm is held securely in place on dovetail ways on the column locked by front and rear clamps.

feed transmission • Built into knee, the feed transmission has hardened alloy steel gears and multi-splined shafts. Twelve changes of feeds are available through a rotary feed selector and a "high-low" series lever located on the side of the knee. Automatic lubrication from enclosed oil reservoir assures constant oiling of all parts.

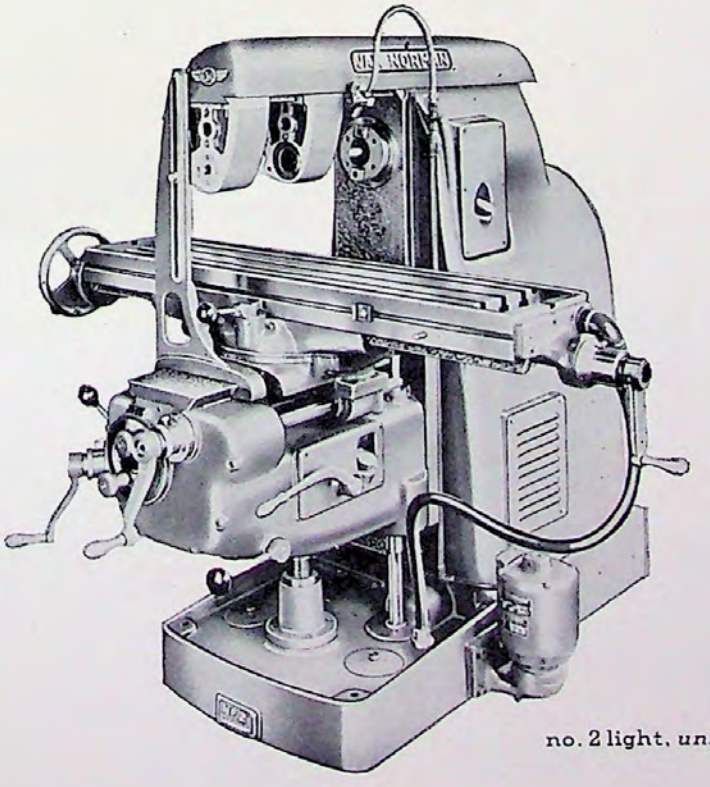
knee • The strong, well-balanced knee is provided with ample bearing surfaces for carrying knee on the column and saddle on the knee. All moving parts within knee are lubricated automatically from enclosed reservoir.

saddle • The correctly proportioned plain or universal saddle assures proper support for the full width of the table. Lubrication of all moving parts is simplified by a one-shot system that distributes the correct amount of lubricant to the various parts through metering valves.

table • Designed for maximum strength, the table is exceptionally large for the type of work for which this machine is designed. It is operated by a large table feed screw.



no. 2 medium, *plain*



no. 2 light, *universal*

		no. 2 light	no. 2 medium
table			
working surface		45 x 10 in.	50 x 10 in.
longitudinal feed		28 in.	28 in.
saddle, crossfeed		10 in.	10 in.
knee			
vertical feed		16 in.	17 in.
maximum distance from C/L of spindle to top of table in lowest position	*pl.*	16 in.	17 in.
	univ.	15 in.	16 in.
overarm			
length		41 in.	41 in.
cutter clearance		6¼ in.	6¼ in.
spindle, National standard			
taper		no. 50	no. 50
number of speeds		18	18
speeds		30 to 1450 rpm	30 to 1500 rpm
feeds			
number of feeds		12	12
feed rates per minute:			
longitudinal		.5 to 36 in.	.5 to 36 in.
cross		.5 to 36 in.	.5 to 36 in.
vertical		.3 to 22 in.	.3 to 22 in.
rapid traverse, power feed rates per minute:			
longitudinal		130 in.	130 in.
cross		130 in.	130 in.
vertical		75 in.	75 in.
coolant reservoir capacity		7 gal.	9 gal.
motor for drive, 1725 rpm, 60 cycle		3 hp	5 hp
dimensions			
base		22 x 41½ in.	25 x 44½ in.
floor area		93 x 60¾ in.	98 x 63¾ in.
height of machine from floor to C/L of spindle		46 in.	48 in.
machine boxed		72 x 69 x 65 in.	72 x 69 x 69 in.
weight of machine without motor, including standard equipment			
net (approx.)	*pl.*	3200 lb.	4000 lb.
	univ.	3300 lb.	4100 lb.
crated (approx.)	*pl.*	3700 lb.	4600 lb.
	univ.	3800 lb.	4700 lb.
boxed (approx.)	*pl.*	3900 lb.	4900 lb.
	univ.	4000 lb.	5000 lb.

standard equipment

set of wrenches, pulleys and belts, style A arbor support (hole size 23/32 in.), style B arbor support for 2⅛ in. sleeve, outer brace, draw-in bar, coolant system. (motor and control not included.)

design and specifications subject to change without notice

VAN NORMAN COMPANY

oscillating radius grinders

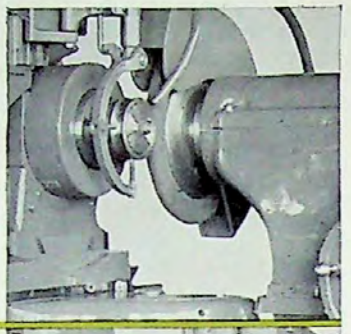
For over 30 years Van Norman Oscillating Radius Grinders have predominated in the ball bearing field throughout the world. Today more ball bearing races are ground on Van Norman Grinders than on all other machines combined. Their versatility and extreme accuracy have been adapted to spherical roller bearings and many spherical types of industrial applications.

Such outstanding advantages as wide-angle oscillation, electronic gauging, continuous roughing and finishing feeds, automatic retraction, diaphram chucks and arbors, a wide variety of grinding cycles and automatic operation, together with extremely heavy workheads, oscillating post, and wheel spindles assure a high output and low cost production of ball bearing raceways and other spherical surfaces.

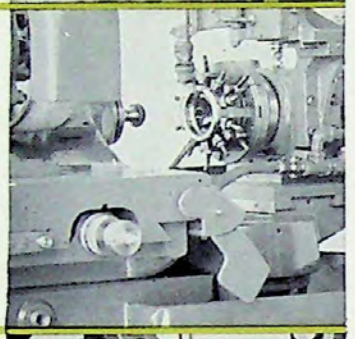
All the various Grinders are fully automatic, except for loading and unloading the work. The operator merely loads the work into the workholding fixture, swings the gauge into position and actuates a conveniently placed control lever which automatically brings the wheel into grinding position and starts the head oscillating and the wheel to feed at its roughing rate. At a predetermined point the feed is reduced to a fine rate. A time relay then gives a definite number of free oscillations without feed to give a uniform finish. The machines can be arranged easily for many different cycles of operation. Under normal conditions the parts can be held to within .0005 in. limits.

Van Norman Oscillating Grinders are available in various sizes and models to grind bearings of all types from ⅜ to 40 in. in diameter. Samples or drawings of parts to be ground are desired in order that suitable recommendations can be made to handle the applications.

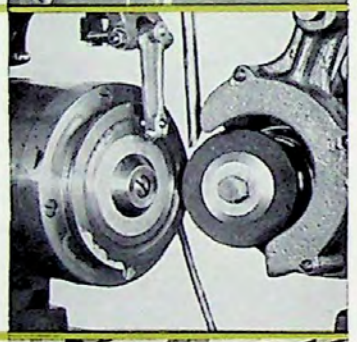
typical grinding operations



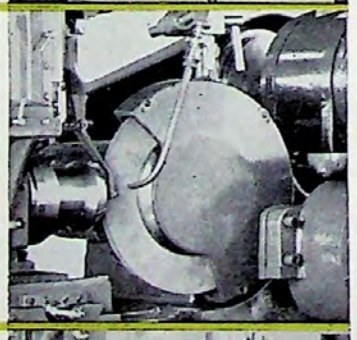
Internal grinding of outer race.



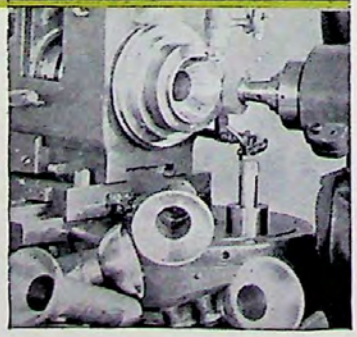
External grinding of inner race.



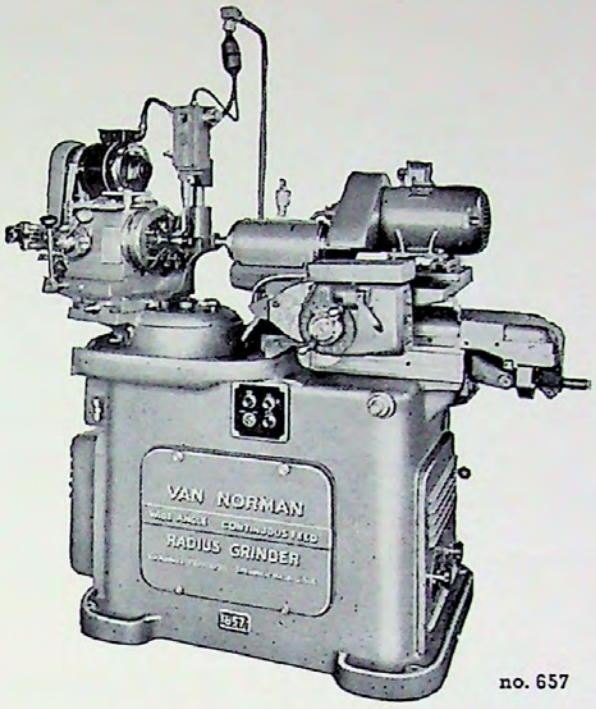
Grinding a thrust bearing.



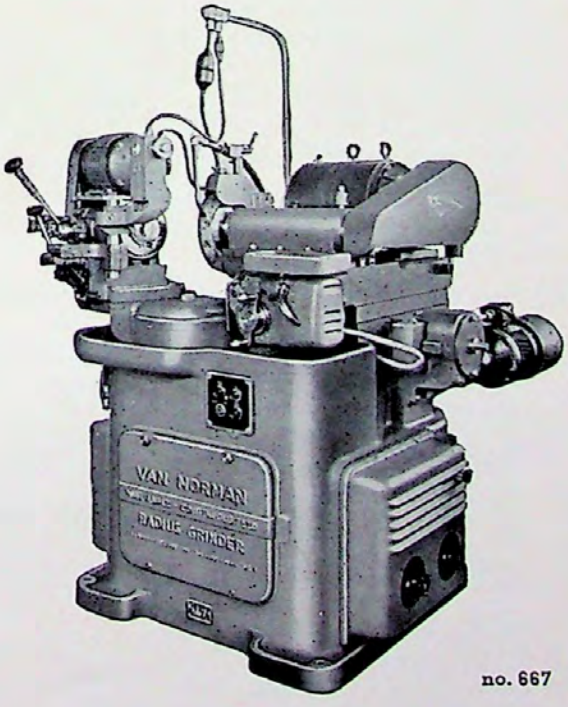
Grinding back radial surface of automotive differential pinion.



Grinding spherical bearing surface in automotive part.



no. 657

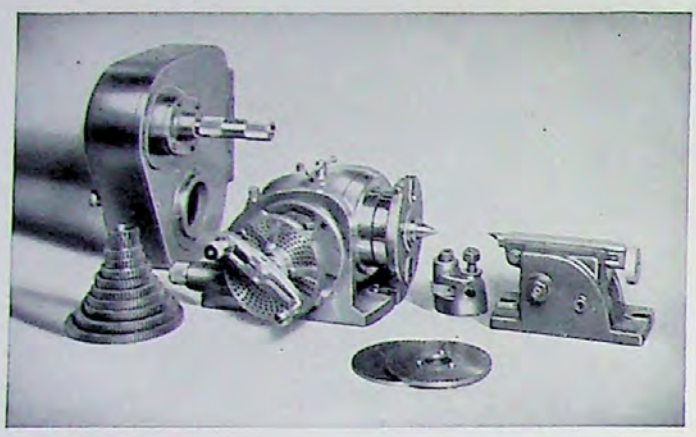


no. 667

typical parts ground

model	application
452	Internal grinding of raceways of small ball bearing outer races up to 204 size (approximately 1⅞ in. diameter).
462	External grinding of raceways of ball bearings up to 1 in. diameter.
6516	Internal grinding of large diameter ball bearing races 6 to 16 in. and various spherical applications.
6616	External grinding of inner races from 6 to 16 in.
6116	Grinding thrust bearings from 5 to 16 in.
657	Internal grinding of outer races 1¾ to 7½ in.
667	External grinding of inner races from ¾ to 5½ in.
615	Grinding thrust bearings up to 5½ in. diam.
605	Grinding a wide variety of industrial applications.

10 in. dividing head • *vertical* swivel



The exceptionally heavy spindle is mounted on anti-friction bearings to provide lasting accuracy. Accurate, long-time operation is assured. Large diameter swivel bearings, with means for locking securely at any angle, provide definite rigidity for severest conditions of operation.

Three index plates are furnished which provide plain indexing in divisions as indicated in the specifications. The enclosed gear drive unit is mounted readily on the left end of the table and assures complete protection for the operator when using the centers on spiral work.

specifications

capacity • Swing, 10 in. diameter.

head • Adjustable 10° below horizontal, 10° beyond vertical.

spindle • Hardened and ground. Spindle nose ground for no. 50 National standard taper.

ratio • Worm-to-worm wheel, 40:1.

hole through spindle • 1½ in. dia.

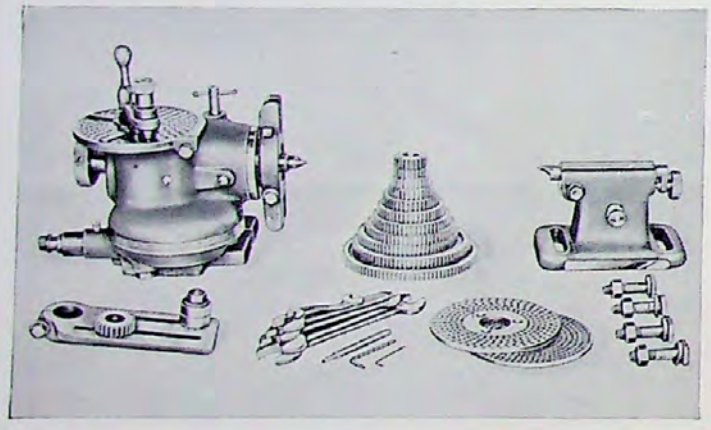
height in vertical position to top of main spindle face • 8½ in.

index plates • 4 furnished to provide plain indexing in all divisions from 1 to 60; all even divisions from 60 to 120. All other divisions to 720 as shown on Van Norman index table.

net weight • 175 lb.

shipping weight • 200 lb.

10 in. dividing head • *horizontal* swivel



The 10 in. Horizontal Swivel Dividing Head in combination with the enclosed gear drive unit for no. 22L, no. 26 and no. 36 (open type gear drive available for no. 12) extends the basic work range of these models to include the cutting of spirals in combination with the Subhead or Universal High Speed Attachment with a plain saddle miller—as well as plain indexing. Universal table models do not require a Subhead or Universal Attachment. Head can be swiveled 360°. Spindle is threaded to take face plates or chucks. Spindle mounted on anti-friction bearings. Tail stock is provided with a retractable T-slot locating lug to permit lateral or angular adjustment across the entire width of the table.

The horizontal swivel as designed into these centers provides facility for convenient angular setting and wide range of taper work.

specifications

capacity • Swing, 10 in. diameter.

head • Adjustable 360° in horizontal plane-graduated dial reading to 1°.

spindle • Hardened and ground. Spindle optional for "C" style collets as used on no. 6 and no. 12, or no. 2 style Van Norman collets as furnished for no. 22L, no. 26, and no. 36. Nose threaded for mounting of chuck.

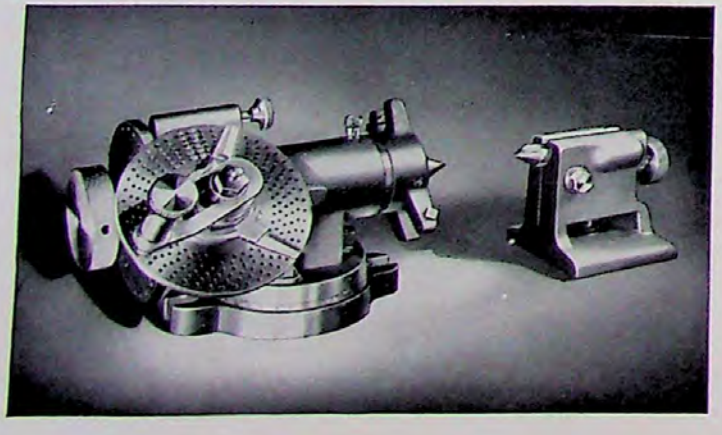
ratio • Worm-to-worm wheel, 40:1.

index plates • 4 furnished to provide plain indexing in all divisions from 1 to 60; all even divisions from 60 to 120. All other divisions to 720 as shown on Van Norman index table.

net weight • 102 lb.

shipping weight • 125 lb.

7½ in. dividing head



The 7½ in. Dividing Head is designed for plain indexing operations, particularly adaptable for Van Norman Millers no. 6 and no. 12. Adaptable to a wide variety of taper and angular work, this model swivels in a horizontal plane through 360°. Its compact design makes it indispensable for the many indexing operations required in the toolroom and experimental department. The spindle is ground to take Van Norman "C" style collets and is externally threaded to take face plates or chucks.

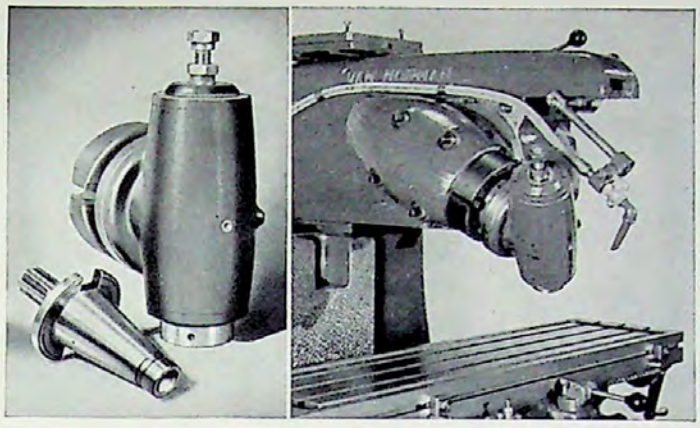
The worm may be disengaged to permit direct indexing by means of index plate mounted on the rear of the spindle. Spindle mounted on anti-friction bearings.

specifications

capacity • Swing, 7½ in. diameter.
head • Adjustable 360° in horizontal plane with graduated dial reading to 1°.
spindle • Hardened and ground. Spindle ground for Van Norman "C" collets; threaded for mounting of chucks and face plates.
ratio • 40:1.
tail stock • Screw adjustment for center.

index plates • 3 furnished to provide plain indexing all divisions from 1 to 50; all even divisions from 50 to 100 plus 55, 65, 75, 85, 95. All other divisions to 360° as shown on Van Norman index table. Direct index plate for 2, 3, 4, 6, 12, and 24 divisions.
net weight • 45 lb.
shipping weight • 55 lb.

universal subhead



The Universal Subhead increases the usefulness of Van Norman Ram-Type Milling Machines in three basic ways:

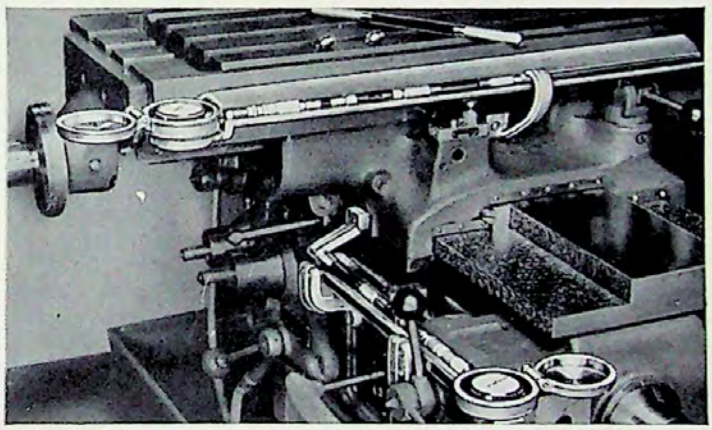
1. For spiral work it is used to position the cutter in the correct lead angle over a wide range.
2. It provides facility for positioning the cutter at any angle for compound angle milling operations.
3. It provides greater effective cross range, permitting milling over large areas without disturbing the setup.

The Subhead is bolted rigidly to face of main cutterhead, and may be set at any working angle. Vertical and horizontal boring and counterboring are simplified also by use of this attachment.

specifications

adjustment • 360° indicated by graduated dial reading to 1°.
spindle • Hardened and ground. Spindle is ground to take Van Norman "C" style collets on no. 6 and no. 12; style no. 2 Van Norman collets for no. 22L, no. 26, and no. 36.
distance from center line of subhead spindle to face of cutterhead spindle • no. 6 and no. 12: 3⅛ in.; no. 22L, no. 26, and no. 36: 5¾ in.
distance from center line of main cutterhead spindle to face of subhead spindle • 5½ in.
speed ratio • 1:1.
mounting • Arranged for mounting on face of cutterhead with bolts provided. Drive through cutterhead spindle by subhead driving arbor.
weights • No. 6, no. 12: net, 35 lb.; shipping, 45 lb. No. 22L, no. 26, and no. 36: net, 75 lb.; shipping, 90 lb.

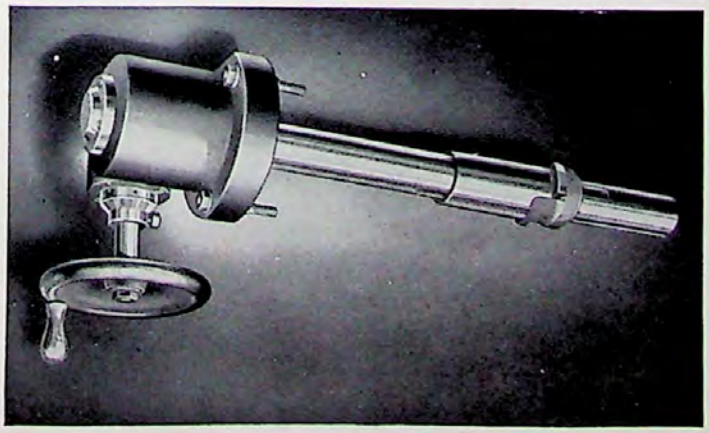
gauge block attachment



The installation of gauge block attachment for either longitudinal or crossfeed movements of the table makes possible the use of Van Norman Millers for the most intricate jig boring operations.

The necessary brackets, troughs and indicator enclosures are available for cross and longitudinal installations. Indicators measuring in .0001 in. in combination with the necessary gauge blocks and micrometer assure the highest degree of accuracy so vital in many toolroom operations. Available for all models.

boring and drilling attachment



This attachment provides simple and convenient means for performing boring and drilling operations in horizontal, angular or vertical positions.

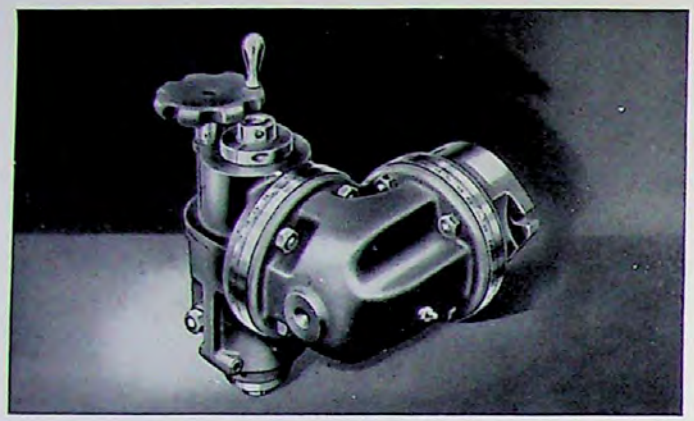
The unit consists of the spindle assembly and front driving sleeve. The assembly is slipped through the main cutterhead spindle and is secured by four bolts and nuts provided. A no. 50 National standard front driving sleeve is provided for the no. 26 and no. 36, while a no. 13 B & S front driving sleeve is provided for no. 22L. This sleeve is inserted in the front end of the cutterhead, serving as a firm front support for the adjustable spindle, as well as a driver for the unit. Convenient adjustment of the spindle through its 4½ in. range is effected by hand wheel having a dial graduated in .001 in. The nose of the spindle is provided with a no. 3 Morse taper.

(Not available on no. 22L with no. 40 National standard spindles.)

specifications

spindle • diameter 1½ in.
spindle • no. 3 Morse taper.
spindle travel • 4½ in.
drive • By means of keyed drive sleeve in front of spindle.
net weight • 30 lb.
shipping weight • 45 lb.

universal high speed attachment



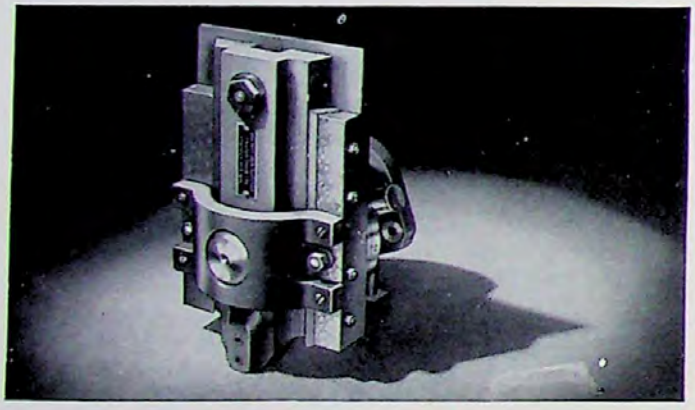
The spindle of this attachment is mounted in a compound swivel element which permits boring, drilling and milling at any angle—a feature invaluable in toolroom, experimental laboratory, and machine shop operation. Spindle quill unit has adjustment of 2½ in. operated by hand wheel actuating screw feed.

Attachment is driven by milling machine spindle by a driving arbor, at speeds 1.66 times greater than machine spindle.

specifications

spindle • Hardened and ground. Quill diameter 3½ in.; spindle ground to take Van Norman style "C" collets.
spindle travel • 2½ in. by hand, graduated dial reading in .001 in.
spindle adjustment • 360° in two planes—graduated dials reading to .001 in.
distance from center line of attachment spindle to face of milling machine spindle (face of column on horizontal models) •
no. 6 and no. 12: 5 in.
no. 22L: 8⅜ in.
no. 26 and no. 6: 8⅜ in.
no. 2 light: 8⅜ in.
no. 2 medium: 8⅜ in.
no. 2 heavy: 8⅜ in.
no. 3 standard: 8⅜ in.
distance from center line of milling machine spindle to center line of attachment spindle • All models 5 in.
maximum distance from center line of milling machine spindle to nose of attachment spindle • 8 in.
net weight • Approximately 85 lb.
shipping weight • 105 lb.

universal slotting attachment



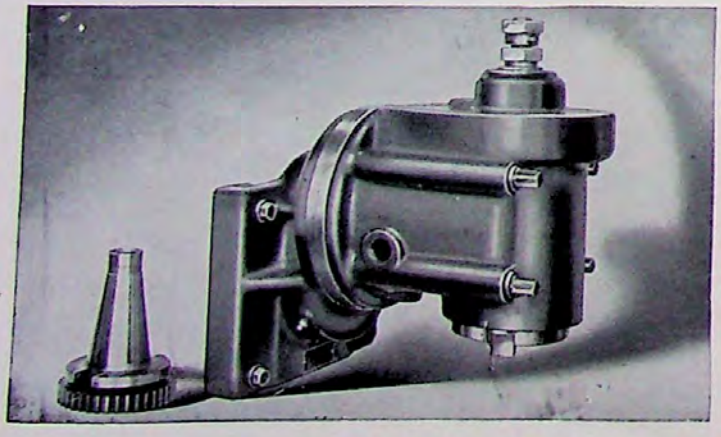
For giving clearance to dies, broaching, spline and keyway cutting, this attachment gives Van Norman Millers added range of capacity. With rigid construction and generously proportioned slide ways, it is operated on a 2 in. fixed stroke. Can be swiveled 360°. On ram-type models, in combination with adjustments of main cutterhead, slotter can be positioned to cut at any angle desired. Slotting head is bored to take round shank slotting tools.

This attachment is adaptable to ram-types or horizontal models. On ram-type models, unit is secured to face of cutterhead. On horizontal models, Slotter is mounted on column. The drives are direct from milling machine spindle by means of driving arbor on all models.

specifications

stroke • 2 in. fixed stroke.
diameter of tool shank hole • no. 6 and no. 12: ½ in. No. 22L, no. 26, no. 36, no. 2 light, no. 2 medium, no. 2 heavy, and no. 3 standard: ⅝ in.
net weight • No. 6 and no. 12: 35 lb. No. 22L, no. 26, no. 36, no. 2 light, no. 2 medium, no. 2 heavy, and no. 3 standard: 70 lb.
shipping weight • No. 6 and no. 12: 50 lb. No. 22L, no. 26, no. 36, no. 2 light, no. 2 medium, no. 2 heavy, no. 3 standard: 90 lb.

heavy duty vertical milling attachment



This attachment provides facility for adapting Van Norman Horizontal models of Milling Machines for vertical work. The unit is exceptionally heavy duty in construction, having a large diameter spindle with no. 50 National standard taper.

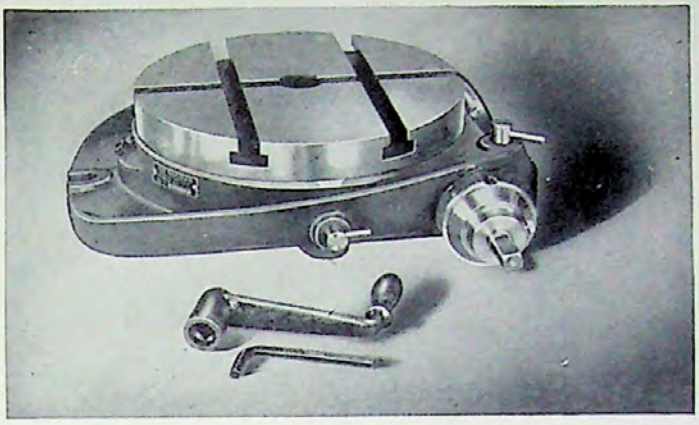
The vertical unit is mounted on a swivel base to provide swiveling at any angle in a plane parallel to the table travel.

The attachment is mounted on the column of the machine by means of dovetailed clamps, initial drive being by means of no. 50 National standard taper driving arbor which is mounted on initial drive gear. The design incorporated in the heavy duty vertical attachment provides exceptional vertical range, the face of the spindle being only 1½ in. below the center line of the milling machine spindle.

specifications

spindle • Hardened and ground. Spindle ground for no. 50 National standard taper.
swivel • In plane parallel to table travel. Locking clamps.
bearings • Anti-friction.
speed ratio • 1:1.
distance from face of column to center line of attachment spindle • 11 in.
distance from center line of milling machine spindle to face of attachment spindle • 1½ in.
net weight • No. 2 light and no. 2 medium: 185 lb. No. 2 heavy, no. 3 standard: 210 lb.
shipping weight • No. 2 light, no. 2 medium: 215 lb. No. 2 heavy, no. 3 standard: 245 lb.

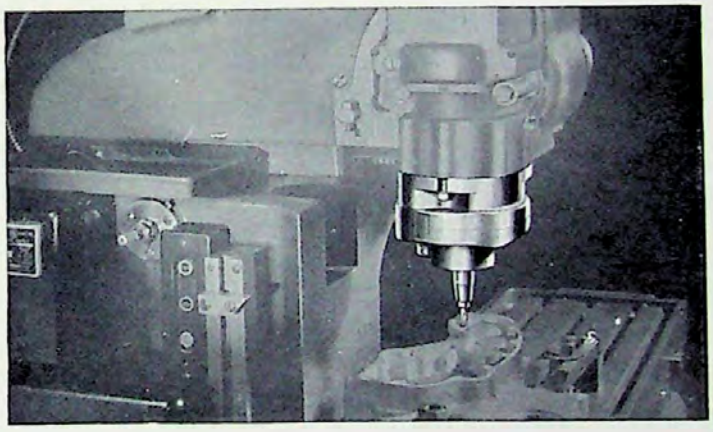
Van Norman precision rotary tables



Van Norman Rotary Tables are made in two sizes—8 and 12 in. diameter. The worm drive can be selectively disengaged so that these tables can be used for hand indexing, or where rapid rotation is desirable. The worm and worm shaft are mounted in an eccentric sleeve which can be instantly rotated to throw the worm out of engagement. A positive stop is provided so that the re-engagement of a worm is accurately controlled. This stop is provided with an adjustment so that worm engagement can be kept in proper mesh to assure minimum backlash, and compensate for normal wear. An indexing plunger is provided so that when the worm gearing is disengaged, the table can be hand indexed in divisions of 2, 3, 4, 6 or 12 indexes per turn. This plunger is of the positive engagement type, controlled by an eccentric, and made with a taper end to provide positive indexing.

specifications		8 in. size	12 in. size
table with T-slots for work mounting	diameter	8 in.	12 in.
	height	3½ in.	4½ in.
	grad. (1° each)	360°	360°
worm dial	one turn equals	6°	4°
	graduated in	5 min.	5 min.
weight	net	60 lb.	130 lb.
	shipping	70 lb.	150 lb.

gear-type high speed attachment



On high-speed work requiring a small diameter cutter, the Gear Type High Speed Attachment gives Van Norman Ram-Type Millers no. 22L, no. 26 and no. 36 added adaptability to perform such operations with fewer changes in setup.

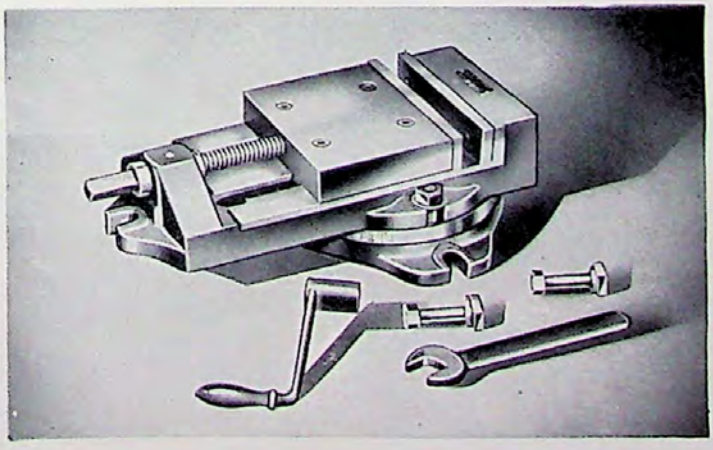
Quickly mounted on the cutterhead by means of three bolts, this attachment provides a range of speeds in 3:1 ratio to the milling machine spindle. The drive is through the main spindle of the machine by means of a driving arbor provided.

Precision ball bearing construction throughout and sealed-in lubrication assure long-life operation. The unit is light in weight and easy to handle. Unexcelled for high speed milling.

specifications

speed ratio • 3:1 in relation to milling machine spindle speeds.
spindle • Hardened and ground for Van Norman "C" style collets.
mounting • On face of main spindle cutterhead by means of bolts.
drive • By means of positive driving lugs mating with slots on milling machine spindle.
bearings • Ball bearing throughout.
distance from face of attachment spindle to face of milling machine spindle • 6¼ in.
net weight • 32 lb.
shipping weight • 40 lb.

Van Norman vises



Van Norman Vises are designed for maximum utility and durability. They are precision-built of high grade, semi-steel castings with hardened steel jaws. The removable lower base permits the vise to be used either as a swivel or a plain type.

specifications		large vise 111-7130	small vise 12-7675
jaws hardened nickel steel	width	7¼ in.	5 5/16 in.
	depth	1¾ in.	1-7/16 in.
	opening	4¼ in.	3 in.
	height: with base	5½ in.	5 in.
	height: without base	3⅞ in.	3⅜ in.
weight:	net	95 lb.	65 lb.
	shipping	110 lb.	75 lb.

standard equipment • Crank handle, table lugs, binder bolts, wrench.

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