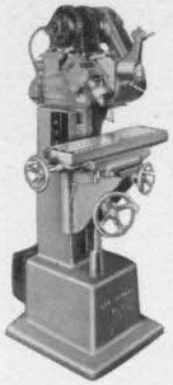
ATTACHMENTS and ACCESSORIES

for

VAN NORMAN

Universal Millers

10″ Universal Spiral Index Centers
7½″ Index Centers
Universal Subhead
Universal Slotting Attachment
Gear Type High Speed Milling Attachment
Motor-Driven High Speed Milling Attachment
Universal High Speed Attachment
Adjustable Boring and Drilling Attachment
7½″ Rotary Table » Vises » Accessories

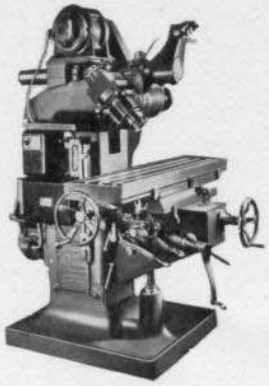


No. 6

Table Size .....30 x 6⅞"
Feed Range .....18 x 5¾ x 16¼"
Ram Movement..11¼"

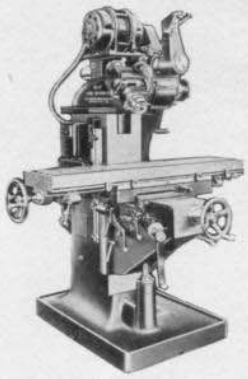
No. 12

Table Size .....37 x 8⅛"
Feed Range.....17 x 6⅞ x 17"
Ram Movement..12¾"



No. 22

Table Size .....45 x 11⅝"
Feed Range.....27½ x 11 x 17½"
Ram Movement..19"



No. 32

Table Size .....55 x 12"
Feed Range 34 x 10⅛ x 22¼"
Ram Movement .19"

ADDED FLEXIBILITY

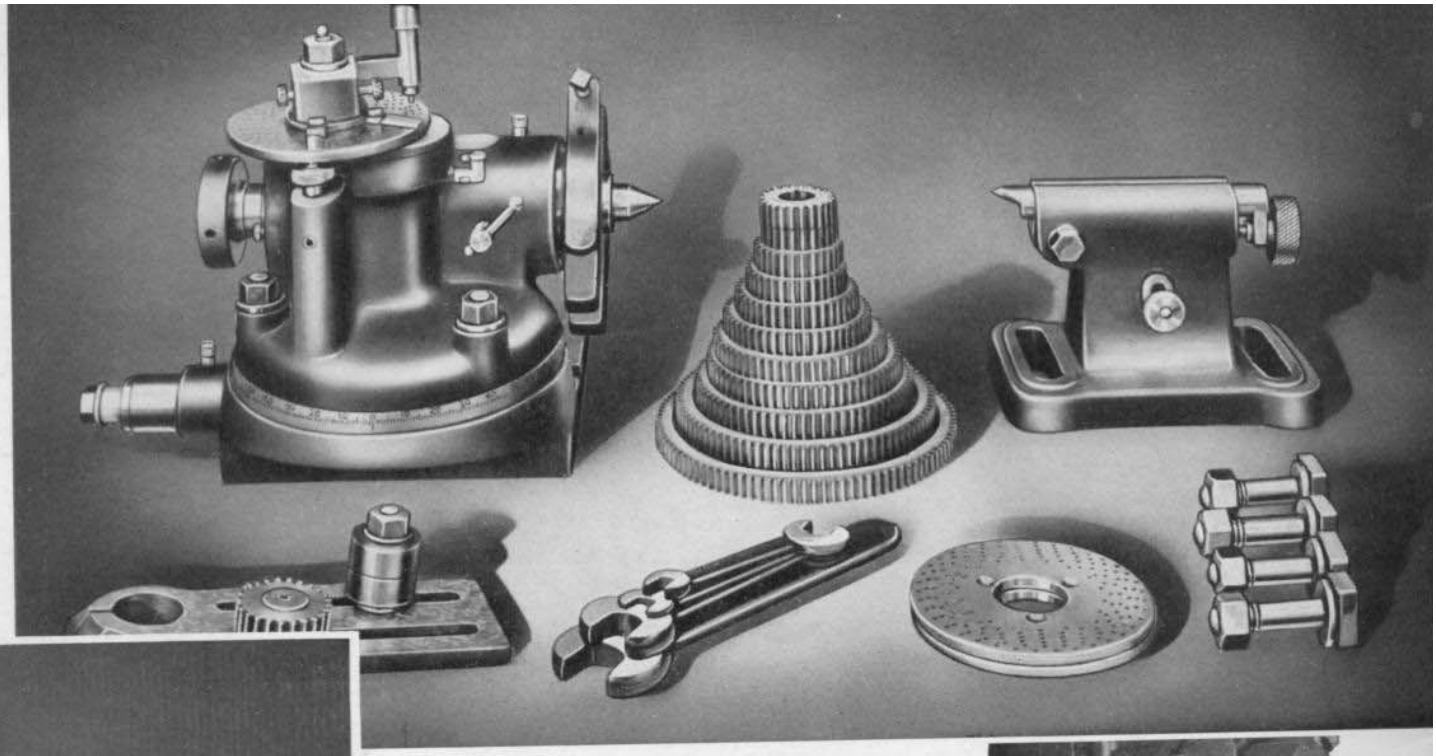
for the Most Flexible of all Universal Milling Machines

The attachments and accessories shown in this catalog are designed to EXTEND the comprehensive work-range of Van Norman Universal Millers—to save ADDITIONAL time and money in the tool room, pattern shop, die shop, experimental laboratory, short run production department, maintenance department, and general machine shop.

For 50 years, Van Norman has steadily developed the flexibility and efficiency of tool room equipment. Van Norman Millers have long been known for their unique advantage of accommodating a large variety of milling operations in the simplest, most economical way. This advantage of flexibility is the sum of two exclusive Van Norman features—the swiveling cutterhead that is adjustable to any position from horizontal to vertical—and the sliding ram that moves the cutter to either side of the job and increases the effective cross-range of the machine.

This exceptional basic work-range is now extended to operations that further increase the usefulness and flexibility of Van Norman Universal Millers to a degree never before possible. Today the four Van Norman Universal Millers shown at the top of this page—in combination with the attachments and accessories shown in the following pages—offer unexampled opportunities for higher quality and accuracy ON A WIDER RANGE OF WORK, at lower cost, with less time and trouble.

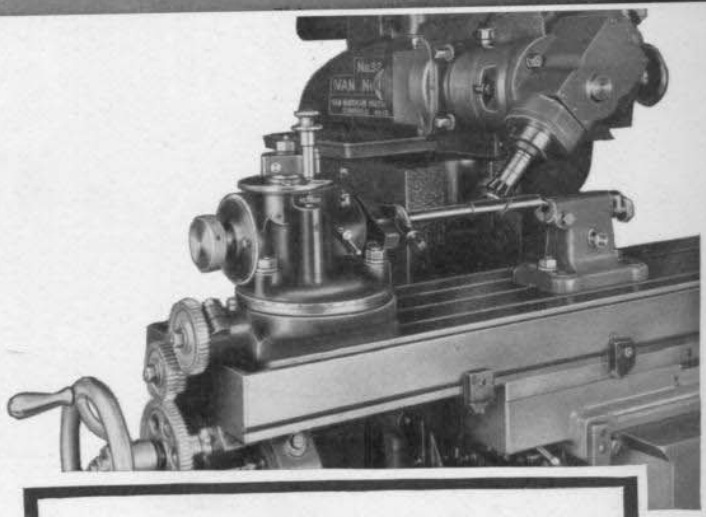
These opportunities will become plainly apparent to you, as you read through the pages of this catalog.



10″ Universal

SPIRAL INDEX CENTERS

for all Van Norman Universal Millers



The new 10″ Universal Spiral Index Centers extend the basic work-range of Van Norman Millers to include the cutting of spirals (in combination with the subhead, or universal high-speed attachment) — as well as plain indexing — on power-feed models No. 12, No. 22, No. 32, and on hand-feed model No. 6. These centers are also adaptable for the same purpose on older models No 2, No. 3, No. 20, and No. 21.

For angular positioning—either for taper spirals, or angular index milling—the headstock can be swiveled 360° in a horizontal plane. Tailstock is provided with retractable T-slot locating lugs, to permit lateral and angular adjustment for taper cutting.

Spindle nose is threaded to take face plates or chucks. A 6″ capacity chuck is ordinarily recommended for use on the 10″ center.

Three indexing plates are furnished. Indexing plate shaft has adjusting lock screws, for splitting holes.

At the right are specifications for application of this center to various models of Van Norman Millers.

SPECIFICATIONS

CAPACITY—Swing, 10″ diameter.

HEAD—Adjustable 360° in horizontal plane indicated by graduations reading to 1°

SPINDLE—Hardened and ground—Furnished either for "C" style collets as used on No. 6 and No. 12 Millers, or 112 collets as furnished for No. 22 and No. 32 Millers. Nose threaded for mounting of chuck.

RATIO—Worm to worm wheel, 40:1.

TAIL STOCK—Adjustable horizontally for taper cutting between centers. Furnished with disappearing T-slot lugs and slotted bolt holes for angular adjustment.

T-SLOT LUGS—Furnished for ½″ or ⅝″ T-slot as standard. Other sizes on special order.

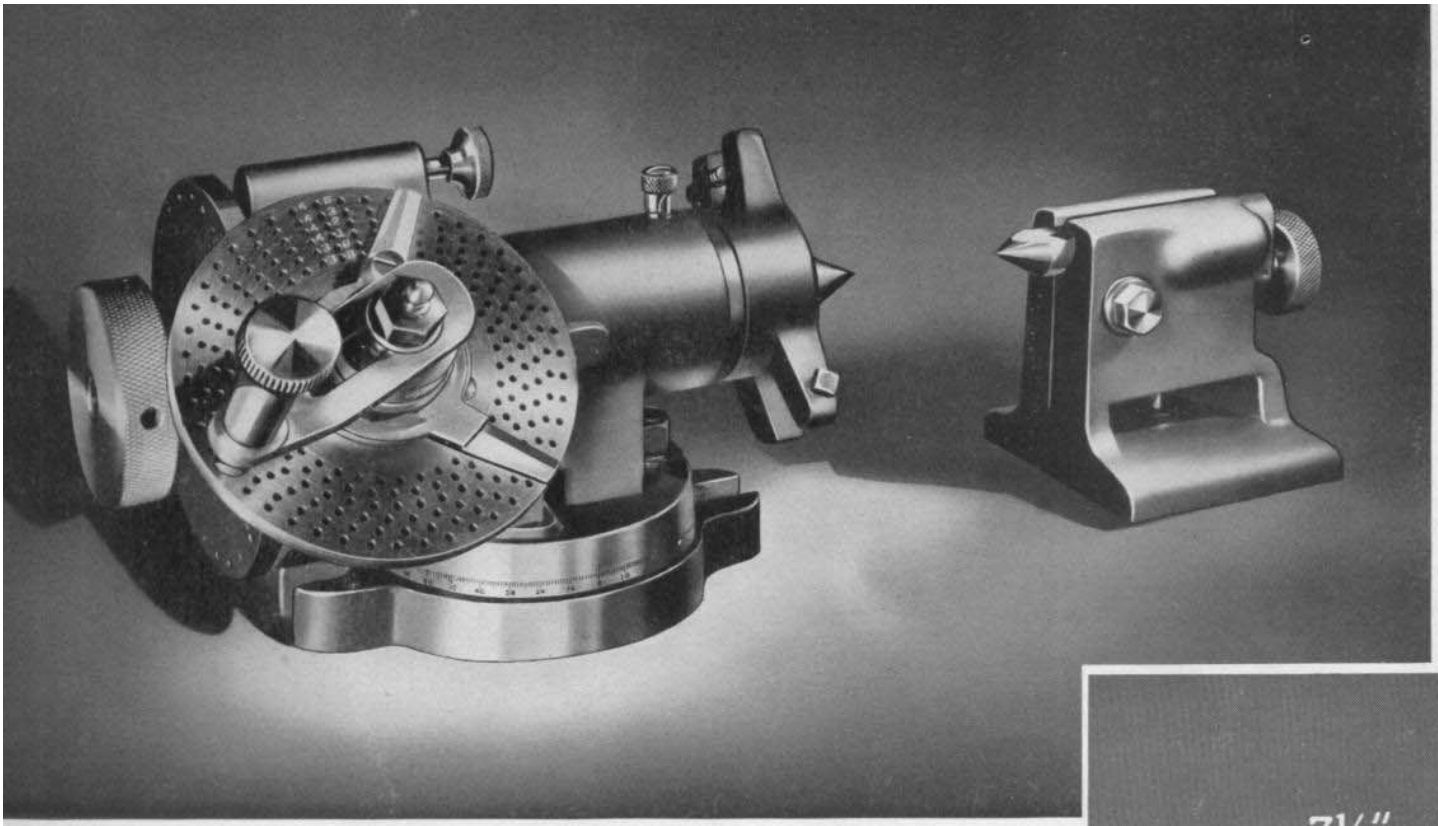
INDEX PLATES—Three furnished to provide: plain indexing all divisions from 1 to 50; all even divisions from 50 to 100 plus 55, 65, 75, 85, 95. All other divisions to 360 as shown on Index Table.

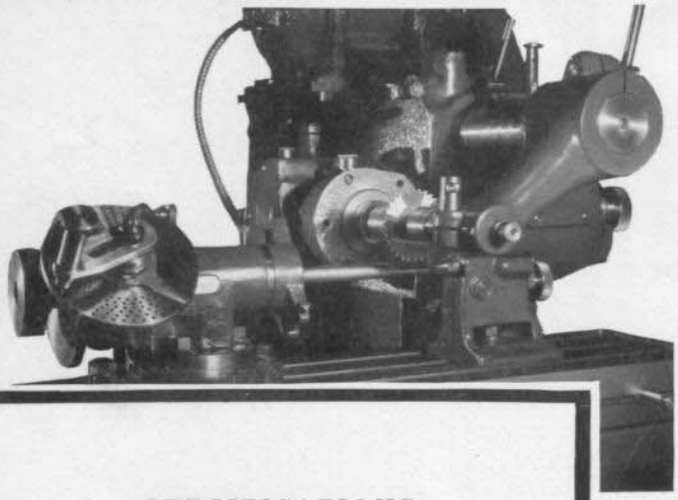
MAXIMUM DISTANCE BETWEEN CENTERS—

No. 6	No. 12	No. 22	No. 32
10″	16½″	24″	33″

NET WEIGHT—92 lbs. SHIPPING WEIGHT—122 lbs.

STANDARD EQUIPMENT—As shown in photograph (top)





7½" INDEX CENTERS

for Van Norman Universal Millers #6 and #12

SPECIFICATIONS

CAPACITY—Swing, 7½" diameter.

HEAD—Adjustable 360° in horizontal plane indicated by graduations reading to 1°.

SPINDLE—Hardened and ground—Furnished for "C" style collets—Nose threaded for mounting of chuck.

RATIO—Worm to worm wheel, 40:1.

TAIL STOCK—Screw adjustment for center.

T-SLOT LUGS—Furnished for ½" T-slots as standard.

INDEX PLATES—Three 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 Index Table. Direct index plate for 2, 3, 4, 6, 8, 12 and 24 divisions.

MAXIMUM DISTANCE BETWEEN CENTERS—

No. 6	No. 12
14"	20½"

NET WEIGHT—38 lbs. SHIPPING WEIGHT (approx.)—51 lbs.

STANDARD EQUIPMENT—4 index plates (1 direct,) Draw-in Spindle, Dog Plate, Base Bolts, Index Chart, Wrench.

The 7½" Index Center is designed for plain indexing operations, particularly on Van Norman Millers No. 6 and No. 12, as well as on older models No. 1/2, No. 10, No. 11.

Swiveling in a horizontal plane through 360°, this center is adaptable to a wide variety of taper and angular work. Its compact design makes it indispensable for the many indexing operations required in the toolroom and experimental department.

Spindle nose is threaded to take plates or chucks. A 4" capacity chuck is usually recommended for use on 7½" centers.

Complete specifications of the 7½" index centers are given at the left.

UNIVERSAL SUBHEAD

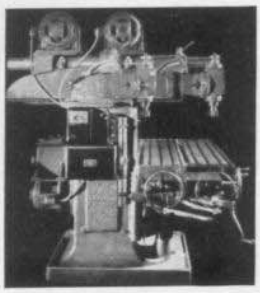
for all Van Norman Universal Millers

In toolroom, pattern, contract, die and experimental work, the Universal Subhead increases the usefulness of your Van Norman Universal Millers by providing three extra utility features:

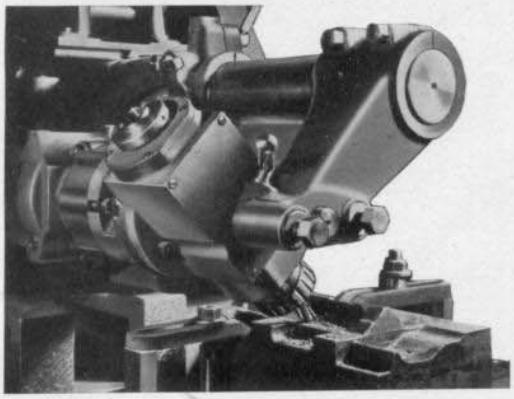
1. In combination with 10″ Universal Spiral Index Centers, it is used to position the cutter correctly on spiral work.
2. It is used for compound angle milling, without necessitating any change in set-up.
3. It is used to secure additional cross-range, providing the facility for milling over large areas without disturbing the set-up. (Note photo below.)

Subhead is bolted rigidly to the face of the main cutterhead, and may be set at any desired working angle, in combination with adjustments of the main cutterhead. Thus most angles of a piece may be milled in one set-up. The operator simply loosens the binding bolts, turns it to the new position, and proceeds. Vertical and horizontal boring, counterboring and facing are also facilitated by this flexibility.

Spindle turns on ball bearings, assuring long life under severest service requirements.



This photo-motion study shows subhead mounted on No. 22 Miller, providing effective cross range of 21½ inches.



SPECIFICATIONS

SUBHEAD—Adjustable 360°, indicated by dial graduations reading to 1°.

NOTE: In combination with cutterhead, subhead can be set at compound angles for spiral cutting and compound angular milling.

SPINDLE—Hardened and ground, front nose internally ground for Style "C" collets on No. 6 and No. 12 Millers; 112 style collet for No. 22 and No. 32. Spindle mounted on ball bearings.

GEARS—Straight bevel. RATIO—1:1.

SPEEDS—Same as machine spindle speeds.

MOUNTING—Arranged for mounting on face of cutterhead by 3 bolts provided. Drive through cutterhead spindle by means of subhead driving arbor.

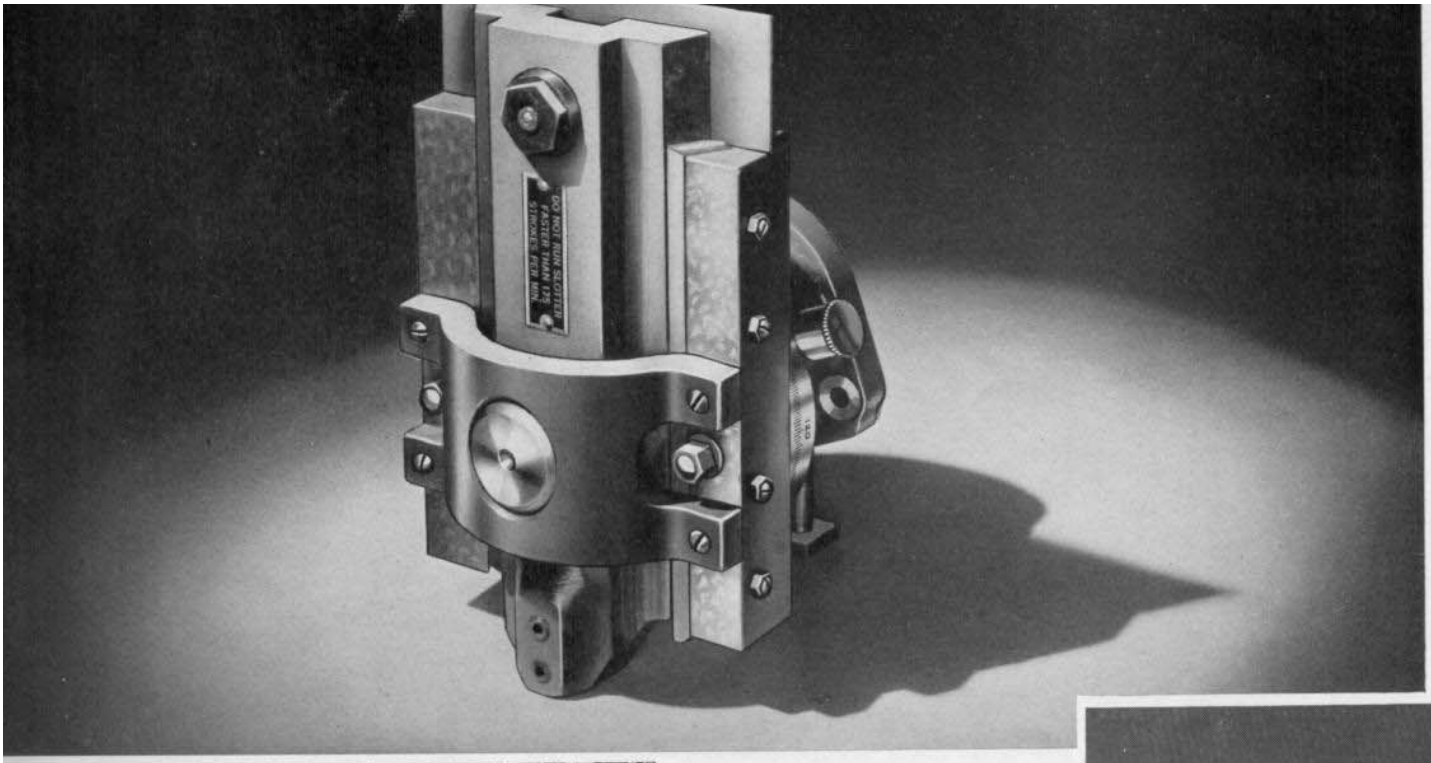
WEIGHTS—NET
No. 6 and No. 12—32 lbs.
No. 22 and No. 32—68 lbs.

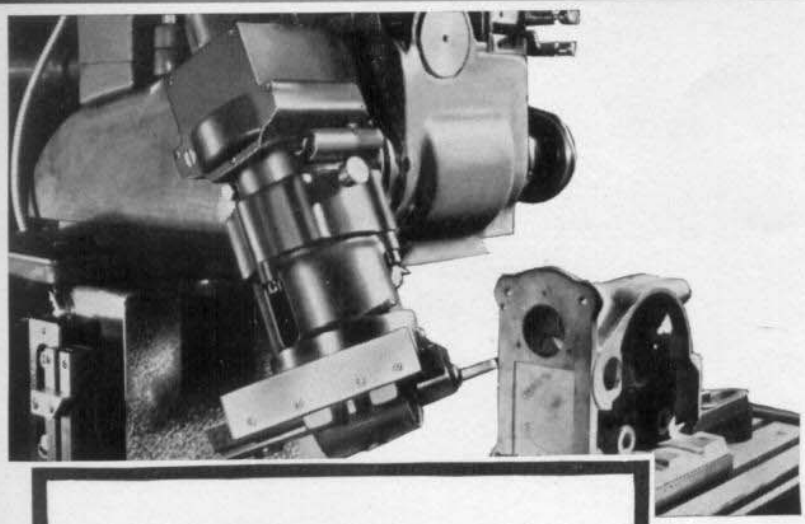
SHIPPING (approx.)
No. 6 and No. 12—44 lbs.
No. 22 and No. 32—88 lbs.

STANDARD EQUIPMENT—Driving Arbor, Socket Wrench Draw-in Spindle, Mounting Bolts.

RANGE

Distance from face of column to center line of spindle.			Distance from nose of spindle to top of table with subhead spindle in Vertical Position.		
	Max. Inches	Min. Inches		Max. Inches	Min. Inches
No. 6	15	3-3/4	No. 6	11-7/8	0
No. 12	16-1/8	3-5/8	No. 12	12-5/8	0
No. 22	21-1/2	2-1/2	No. 22	13	0
No. 32	21-1/2	2-1/2	No. 32	18-1/4	0





UNIVERSAL SLOTTING ATTACHMENT

for all Van Norman Universal Millers

SPECIFICATIONS

SLOTTER—Adjustable 360°, indicated by dial, graduations reading to 1°.

MOUNTING—Arranged for mounting on face of cutterhead by three bolts provided. Drive through cutterhead spindle by means of slotted driving arbor.

STROKE—2" fixed stroke.

DIAMETER OF TOOL SHANK HOLE—
No. 6 and No. 12 ½"
No. 22 and No. 32 ⅝"

NET WEIGHT—No. 6 and No. 12 34 lbs.
No. 22 and No. 32 53 lbs.

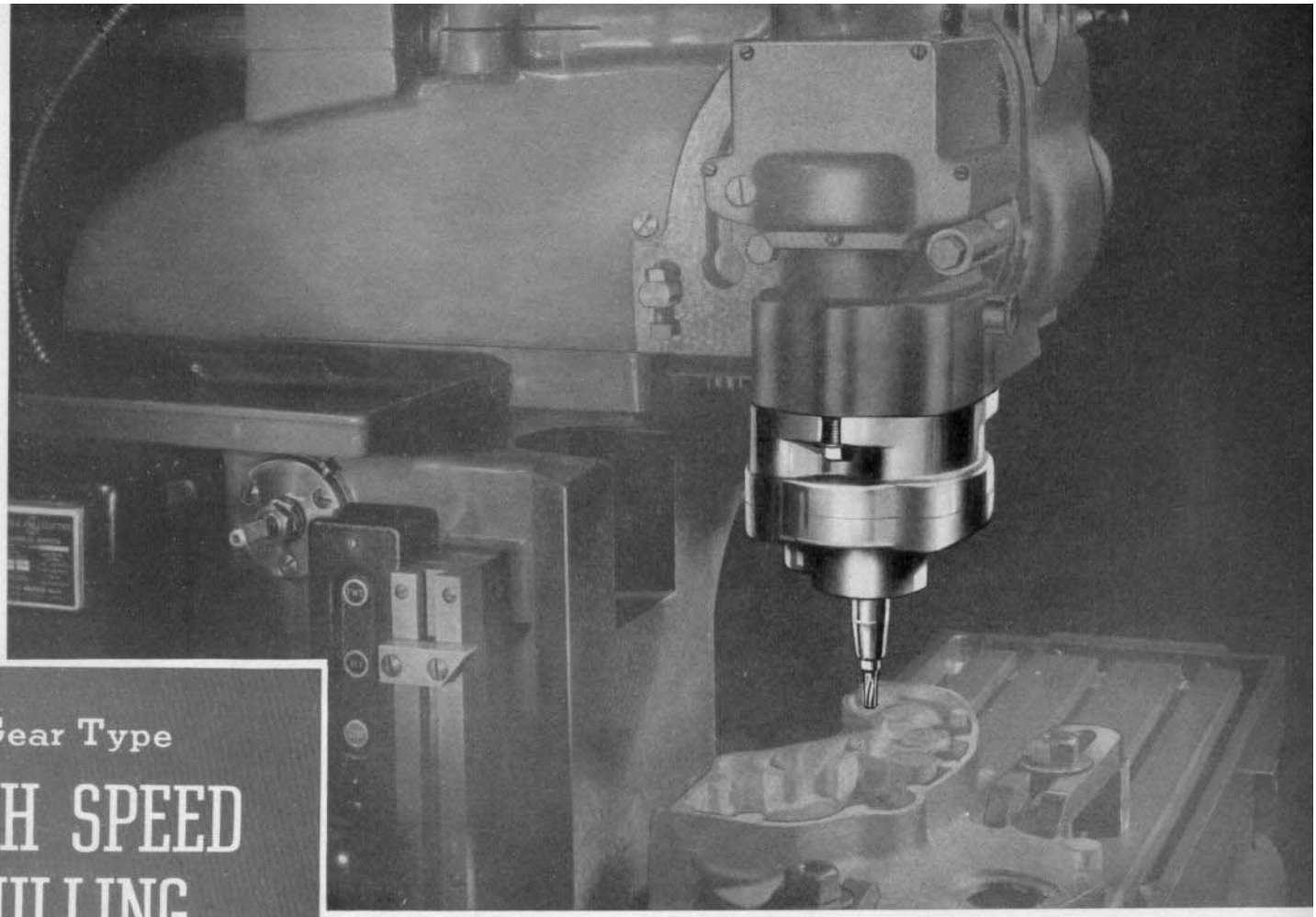
SHIPPING WEIGHT (approximate)—
No. 6 and No. 12 47 lbs.
No. 22 and No. 32 70 lbs.

STANDARD EQUIPMENT—Necessary Wrenches, Mounting Bolts, Driving Arbor.

RANGE

	Distance from face of column to center line of tool hole.		Distance from top of table to face of tool hole, Slotter in vertical position.	
	Max. Inches	Min. Inches	Max. Inches	Min. Inches
No 6	14-7/8	3-1/2	10-7/8	0
No. 12	15-7/8	3-3/8	11-5/8	0
No. 22	22-5/8	3-5/8	13-5/8	0
No. 32	22-5/8	3-5/8	18-5/8	0

For giving clearance to dies, for broaching, for spline and keyway cutting, this attachment gives Van Norman Universal Millers an exceptional range of work in toolrooms, contract, pattern, die and experimental shops. Ordinarily difficult cuts are greatly simplified. Of rigid construction with generously proportioned slide ways, the unit is operated at a 2" fixed stroke. In combination with adjustments of the main cutterhead, the slotter can be positioned to cut at any angle or combination of angles. It can be swivelled 360°. Thus, accuracy is safeguarded by elimination of the errors that always creep in with repeated resetting, and in changing the work to different machines.



Gear Type

HIGH SPEED MILLING ATTACHMENT

for Van Norman Universal Millers #22 and #32

On high-speed work requiring a small-diameter cutter—and on work that requires the machining of aluminum, soft metals and molded compounds — the Gear Type High Speed Attachment gives Van Norman Millers No. 22 and No. 32 the added adaptability to perform any operations required, with fewer changes in set-up.

Quickly mounted on the cutterhead by three bolts, this attachment provides a range of 9 spindle speeds, up to 3300 R.P.M. A 3-to-1 gear ratio is provided.

The Gear Type High Speed Attachment is of ball bearing construction throughout, with the structural stamina necessary to stand up under the most rigorous service requirements. Yet it is light in weight—easy to handle.

SPECIFICATIONS

SPEED RATIO—3:1. Number of speeds same as main cutter.

SPINDLE—Hardened and ground to take "C" style collets. Capacity, 5/8" diameter.

MOUNTING—Mounted on face of main cutterhead by means of three bolts.

DRIVE—By means of positive driving lugs mating with slots on face of main cutterhead.

BEARINGS—Spindles and gears mounted on ball bearings.

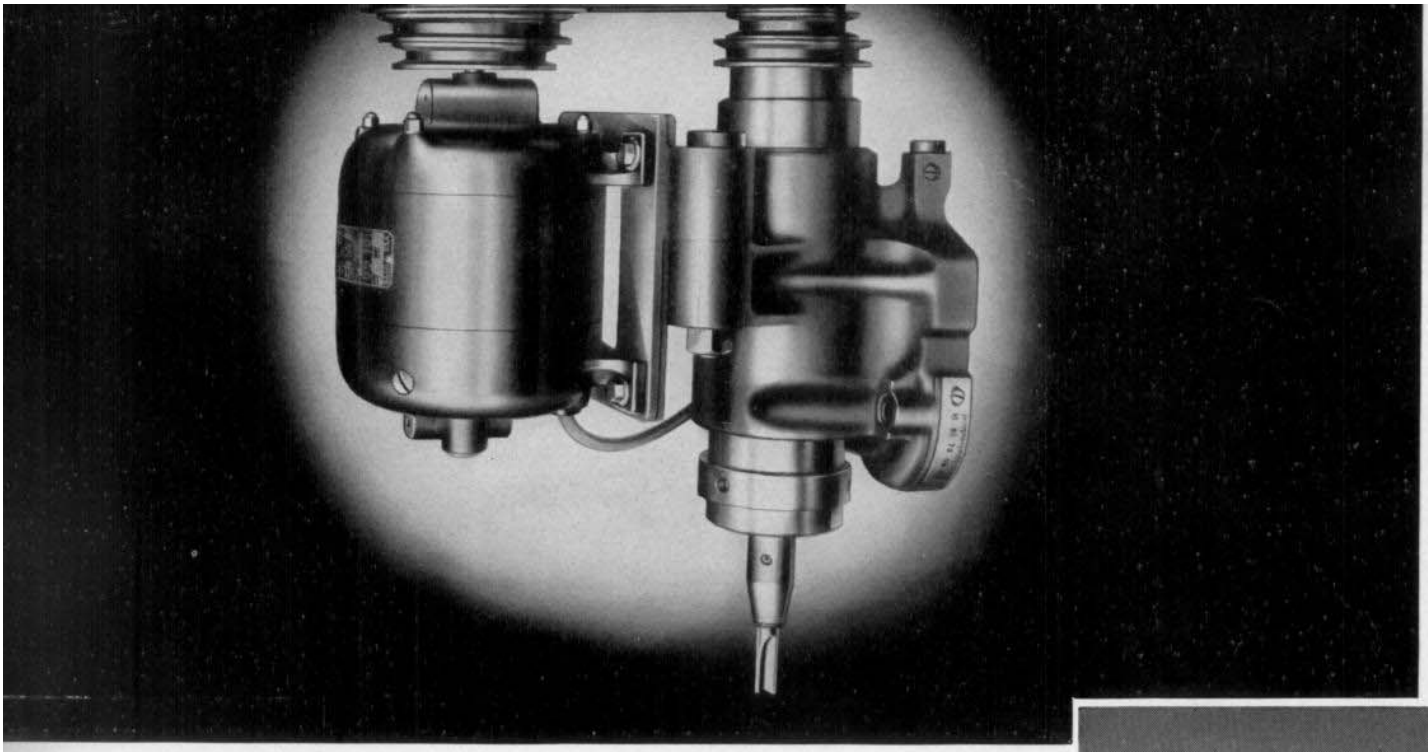
NET WEIGHT—29 lbs.

SHIPPING WEIGHT (approximate)—41 lbs.

STANDARD EQUIPMENT—Draw Bar, Draw Bar Socket Wrench, 3/8" Chuck, Mounting Bolts.

RANGE

Distance from face of column to nose of spindle with head in Horizontal Position.			Distance from top of table to spindle nose with head in Vertical Position.		
	Max. Inches	Min. Inches		Max. Inches	Min. Inches
No. 22	23	4-1/8	No. 22	6-1/4	0
No. 32	23	4-1/8	No. 32	11-1/4	0



Motor Driven

HIGH SPEED MILLING ATTACHMENT

for Van Norman Universal Millers #6 and #12

SPECIFICATIONS

HIGH SPEED ATTACHMENT—Adjustable 90°, graduations reading to 1°.

SPINDLE SPEEDS—1900, 2700, and 4000 R.P.M. by means of three stepped pulleys.

SPINDLE NOSE—No. 5 B & S Taper or collet type ⅜" capacity.

BEARINGS—Spindle mounted on ball bearings.

MOUNTING—In place of main cutterhead, held by the three cutterhead bolts on ram.

DRIVE—Individual motor drive, ¼ H.P. 1725 R.P.M., 110 volts 60 cycle, single phase.

WEIGHT—Net 72 lbs. SHIPPING WEIGHT—90 lbs.

STANDARD EQUIPMENT—¼ H.P., 1725 R.P.M., 110 volts, 60 cycle, single phase motor. (Other current specifications at extra cost). V Belt, spanner wrench, drift, motor cord and plug, motor switch.

NOTE: When collet type spindle is supplied, no drift is furnished.

RANGE

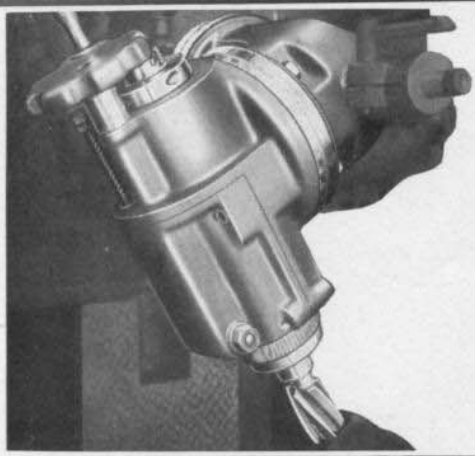
Distance from face of column to spindle nose. Head in horizontal position.			Distance from top of table to spindle nose, with head in vertical position.		
	Max. Inches	Min. Inches		Max. Inches	Min. Inches
No. 6	11-3/8	0	No. 6	10-3/8	0
No. 12	12-3/8	0	No 12	10-1/2	0

Whenever it is desired to run milling cutters of diameters smaller than can be accommodated by the standard No. 6 and No. 12 Van Norman spindle speeds, the Motor-Driven High Speed Attachment will expedite the work and materially increase the usefulness of these Van Norman Universal Millers. This attachment is assembled in a separate head which is mounted in place of the regular cutterhead. The ball bearing spindle is belt-driven by a ¼ horsepower motor operating at 1725 R.P.M. Three step cone pullies are furnished to give speeds of 1900, 2700, and 4000 R.P.M.

As with the regular cutterhead adjustments, the spindle of this attachment can be positioned in any angle from horizontal to vertical—a feature of utmost importance in obtaining highest accuracy and economy.

UNIVERSAL HIGH SPEED ATTACHMENT

for all Van Norman Universal Millers



Work-range of all Van Norman Millers is now further extended to include drilling and boring operations—at any conceivable angle—by the use of the new Universal High Speed Attachment, equipped with an adjustable spindle.

This attachment is driven by the main cutter spindle, through driving lugs, at speeds 1.66 times greater than standard spindle speeds. Spindle is of ball bearing construction throughout, and is mounted in an adjustable cage of large diameter.

The spindle cage unit is adjustable through a range of 2½″, by means of a screw actuated by a convenient hand wheel which is provided with a dial graduated in .001″. Spindle can be securely clamped at any point within its range of adjustment.

The spindle is mounted in a compound swiveling element that permits boring, drilling and milling at any angle—a feature that is invaluable in toolroom, experimental laboratory, pattern and machine shop operations. Of equal importance is the exceptional rigidity maintained by the rugged spindle assembly, and by the milling machine overarm bracket center.

SPECIFICATIONS

SPINDLE—Hardened and ground—3½″ diameter. Inside of front nose ground to take Style "C" collets up to ⅝″ capacity held by threaded closure cap. Spindle mounted on ball bearings in sleeve adjustable by worm and hand wheel with graduated dial reading in .001″.

SPINDLE TRAVEL—2½″.

SPINDLE ADJUSTMENT—360° in two planes providing universal adjustment for boring, drilling and milling compound angle positions. Graduations reading to 1°

SPEED RATIO—5:3.

NUMBER OF SPEEDS—Same as main cutterhead.

MOUNTING AND DRIVE—Mounted on face of cutterhead by three bolts. Provision for outboard support by overarm support bracket. Attachment is driven by means of driving arbor held in main cutterhead spindle by means of draw bar. Lubrication by single pressure grease fitting.

NET WEIGHT—63 lbs. SHIPPING WEIGHT (approx.)—85 lbs.

STANDARD EQUIPMENT—Spanner wrench for spindle chuck closure cap, Drive Arbor, Mounting Bolts.

RANGE

Head in vertical position. Distance from face of column to center line of spindle.

	Max. Inches	Min. Inches
No. 6	16-1/4	4-7/8
No. 12	17-1/4	4-3/4
No. 22	22-5/8	3-5/8
No. 32	22-5/8	3-5/8

Head in vertical position. Distance from top of table to spindle nose.

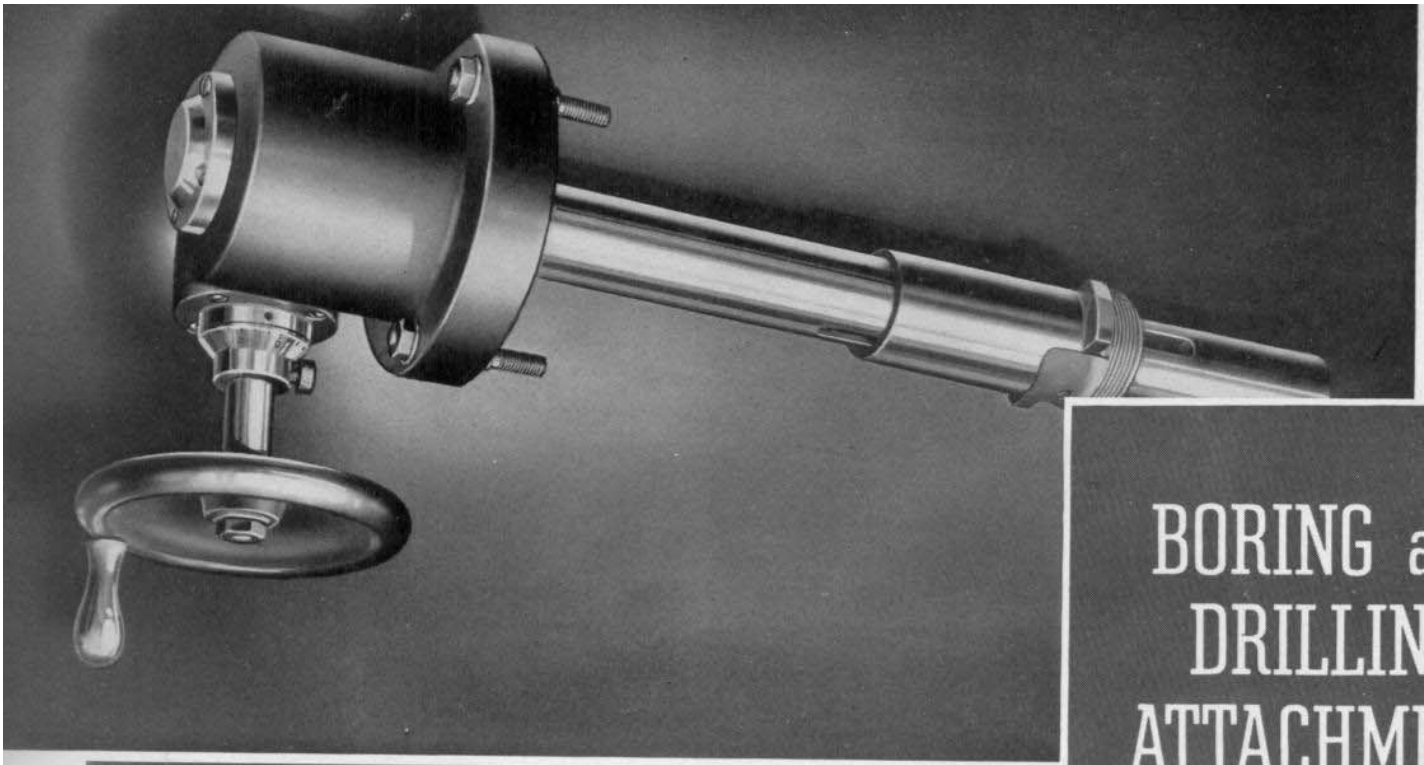
	Max. Inches	Min. Inches
No. 6	10-1/4	0
No. 12	11	0
No. 22	13	0
No. 32	18-1/4	0

Head in horizontal position with spindle nose facing away from column. Distance from face of column to spindle.

	Max. Inches	Min. Inches
No. 6	22-1/8	10-7/8
No. 12	23-1/4	10-3/4
No. 22	28-1/8	9-1/8
No. 32	28-3/8	9-3/8

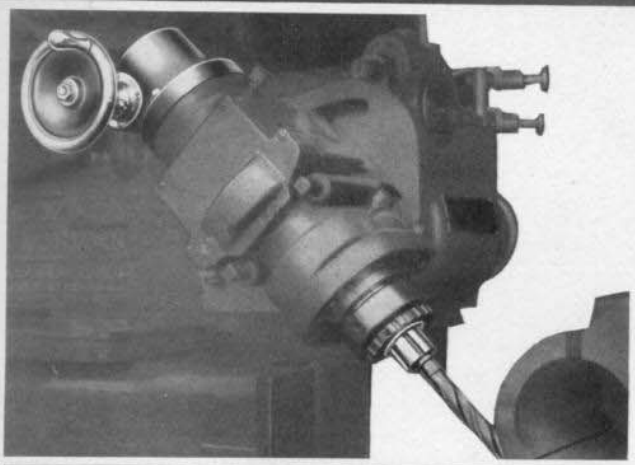
Head in horizontal position with spindle nose facing toward column. Distance from face of column to spindle nose.

	Max. Inches	Min. Inches
No. 6	10-1/4	3/4
No. 12	11-1/4	1/4
No. 22	17	0
No. 32	16-1/4	0



BORING and DRILLING ATTACHMENT

for Van Norman Universal Millers #22 and #32



The Boring and Drilling Attachment provides simple and convenient means for performing the many operations of this type necessary in the toolroom, experimental department, pattern shop and machine shop. It is available only for Van Norman Millers No. 22 and No. 32.

Quickly installed in the cutterhead spindle, this attachment provides a 4½″ spindle movement for drilling and boring holes vertically, horizontally, or at any angle within the range of the exclusive Van Norman adjustable cutterhead.

The unit consists of the spindle assembly, and front driving sleeve. Spindle assembly is merely slipped through the main cutterhead spindle, and secured by the four bolts and nuts provided. The driving sleeve has a No. 13 B & S Taper outside, and is inserted in the front end of the cutterhead, serving as a firm front support for the adjustable spindle—as well as a means for driving it at speeds corresponding to the main spindle speeds.

Convenient and effortless movement of the spindle throughout its adjustment of 4½″ is effected by a hand wheel provided with a dial graduated in .001″. Nose of spindle is provided with a No. 3 Morse Taper.

SPECIFICATIONS

SPINDLE—Inserted in main cutter spindle; held in position by four bolts on top of cutterhead.

SPINDLE NOSE—No. 3 Morse Taper.

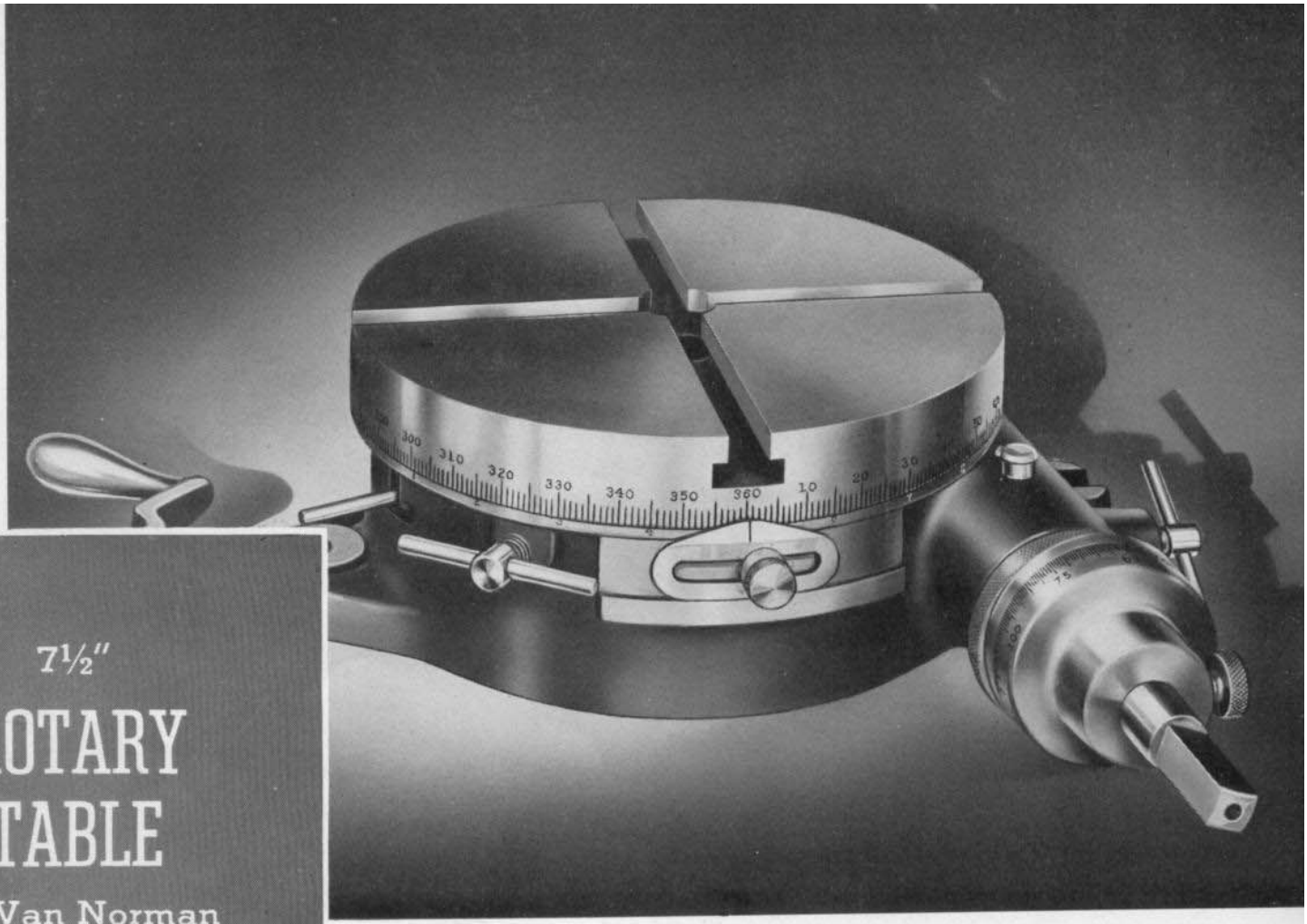
SPINDLE ADJUSTMENT—By means of worm and convenient hand wheel provided with graduated dial indicating .001″.

SPINDLE TRAVEL—4½″.

DRIVE—By means of No. 13 B & S keyed drive sleeve inserted in front of cutterhead spindle.

NET WEIGHT—26 lbs.

SHIPPING WEIGHT—35 lbs.



7½" ROTARY TABLE

for Van Norman Universal Millers

The 7½" Hand-Feed Rotary Table is of small diameter and minimum height, to conveniently adapt the smaller models of Van Norman Millers (No. ½, No. 6, No. 10, No. 11, No. 12) for all types of circular milling on plain or irregular pieces. It is equally adaptable to many jobs on larger Van Norman Millers.

WIDE BEARING SURFACE

The table section is of semi-steel casting with a large bearing area extending to outer edge of the base. Mounted on a taper center bearing, permanent preservation of the original accurate fit is assured.

LOST MOTION ELIMINATED

Simple means for elimination of worm end-thrust is provided by adjusting nuts. Lost motion or lash is prevented by cam adjustment and lock, which also provides for quick disengaging of worm for swiveling table by hand. Table can be bound in any position.

READINGS IN DEGREES AND MINUTES

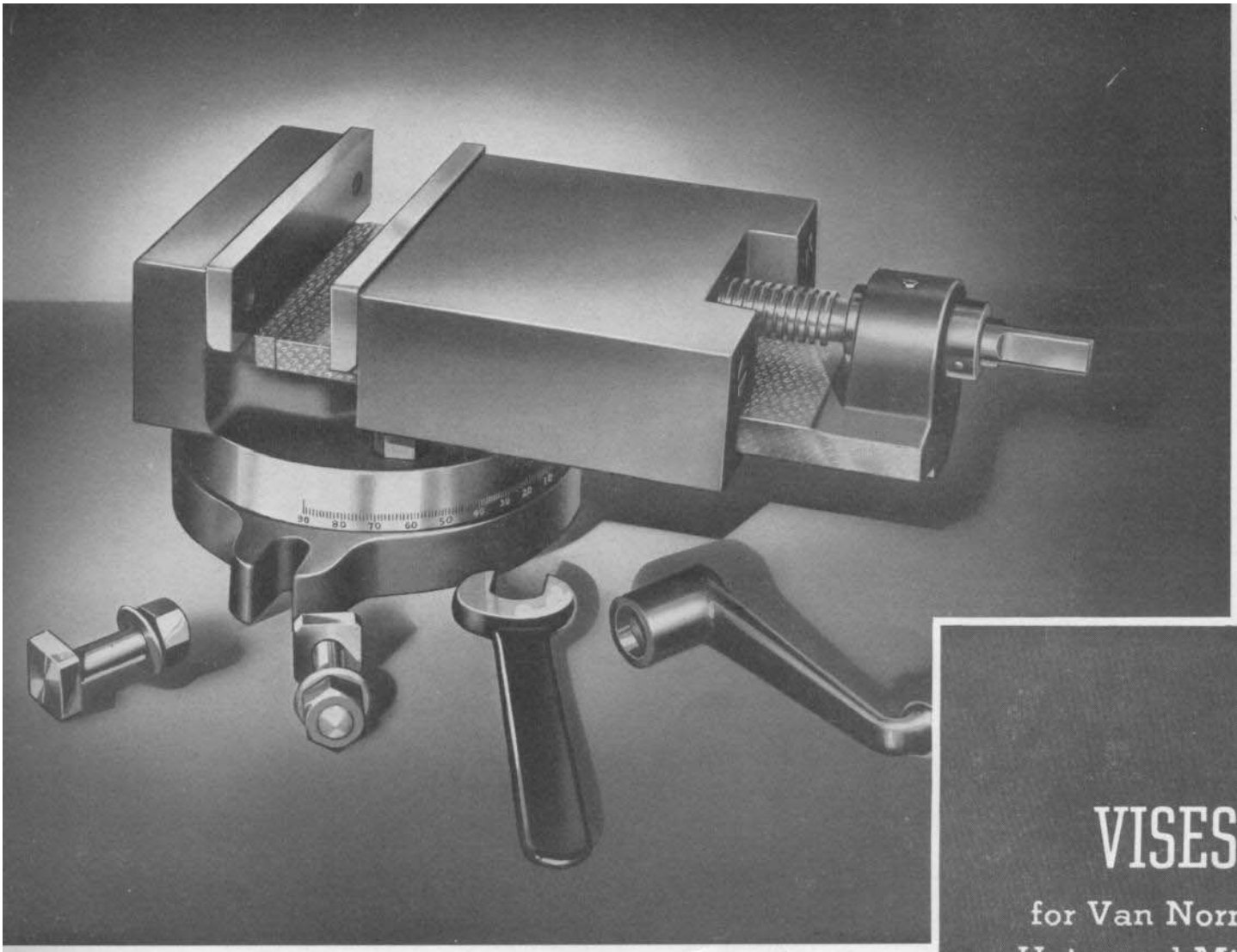
The edge of the table is marked with 360 graduations for reading in degrees. An adjustable zero-line is also provided. The worm shaft carries an adjustable collar, graduated for readings in single minutes.

QUICK INDEXING

A vertical lock pin engages in any one of 24 stations on the underside of the table near the outer edge, affording divisions of 2, 3, 4, 6, 8, 12 and 24.

SPECIFICATIONS

Diameter of table	7½ in.
Height	3 5/16 in.
Dia., hole through center	15/16 in.
Width of tee slots	7/16 in.
Length, overall	10 in.
Net Weight	42 lbs.
Shipping Weight, approx.	52 lbs.



VISES

for Van Norman Universal Millers

SPECIFICATIONS

JAWS—Hardened nickel steel.

STANDARD EQUIPMENT—Crank Handle, Table Lugs, Binder Bolts, Wrench.

DIMENSIONS:

	111-7128 Large Vise	J-7408 Small Vise
Width of Jaws	7″	5″
Depth of Jaws	1-1/2″	1-1/16″
Opening	4-1/4″	2-1/2″
Height	5-3/4″	4-3/16″
Table Lugs—width	5/8″	1/2″
Swivel Range	360°	360°
Weight—Net	90 lbs.	28 lbs.
Shipping Weight	110 lbs.	35 lbs.

Van Norman Vises are furnished in two sizes—Model No. 111-7128 Large Swivel Vise for Van Norman Millers No. 22 and 32, and for older models No. 2, No. 20, No. 21 and No. 3—and Vise Model J-7408 for smaller models No. 6 and No. 12, as well as for previous models No. ½, No. 10, and No. 11.

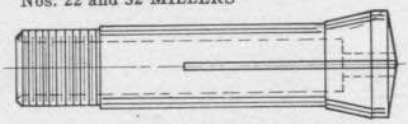
These vises are designed for maximum utility and durability. They are precision-built, of high-grade semi-steel castings, with hardened steel jaws. Vise body is mounted on a graduated swivel base, to permit convenient adjustment.

Complete specifications are given at the left.

COLLETS

For Nos. 6-12-½-10-11-2 VAN NORMAN MILLERS, 7½" INDEX CENTERS, 10" CENTERS for Nos. 6 and 12 MILLERS, SUBHEADS for Nos. 6-12 MILLERS, HIGH SPEED ATTACHMENTS for Nos. 22 and 32 MILLERS

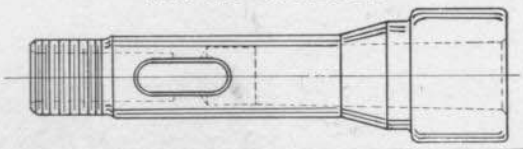
SPLIT COLLETS



Style	DESCRIPTION	Code
C	Split Collet	DUCOL

SIZES: 1/64" to 5/8" by 1/64" (Metric 1.5 to 16 M.M.)

TAPER COLLETS

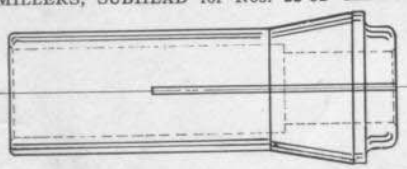


Part No.	DESCRIPTION	Code
C-361	No. 5 B & S Taper Collet	DTCFB
J-228	No. 7 B & S Taper Collet	DTCSB
C-413	No. 1 Morse Taper Collet	DTCXV
*111-455	No. 2 Morse Taper Collet	DTCTM

* Tang Drive

For Nos. 22-32-20-21-3 VAN NORMAN MILLERS, 10" CENTERS for Nos. 22-32 MILLERS, SUBHEAD for Nos. 22-32 MILLERS

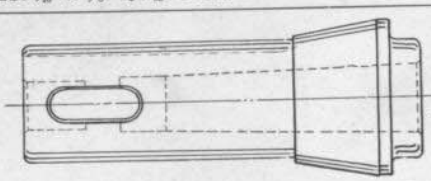
SPLIT COLLETS



Style	DESCRIPTION	Code
112	Split Collet	DUCUS

SIZES: 1/16" to 7/8" by 1/32" (Metric 2 to 23 M.M.)

TAPER COLLETS

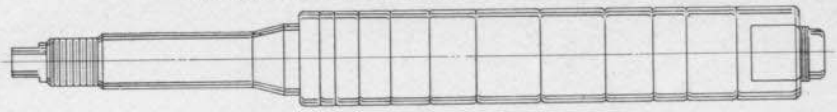


Part No.	DESCRIPTION	Code
112-564	No. 5 B & S Taper Collet	ATCFB
*112-548	No. 7 B & S Taper Collet	ATCSB
112-616	No. 1 Morse Taper Collet	ATCOM
*112-615	No. 2 Morse Taper Collet	ATCTM

* Tang Drive

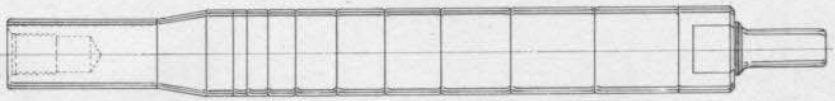
CUTTER ARBORS

CUTTER ARBORS ON STYLE C COLLET SHANK (Hardened and Ground Collars)
For Nos. 6-12-½-10-11-2 VAN NORMAN MILLERS



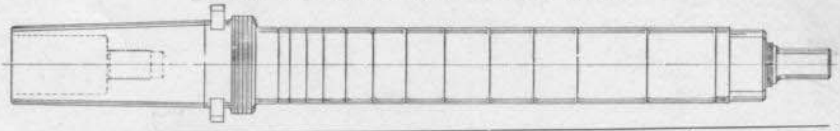
Part No.	Diameter of Arbor	Length Shoulder to Nut	Size of Keyway Width and Depth	Code
J-263	7/8"	3 1/16"	No keyway	DASET
J-283	7/8"	6 1/2"	No keyway	DASES
111-362	7/8"	12"	No keyway	DASEW
111-363	1"	3 1/2"	1/4" x 1/32"	DAONT
111-572	1"	6"	1/4" x 1/32"	DAONS
111-538	1"	12"	1/4" x 1/32"	DAONW

CUTTER ARBOR ON STYLE 112 COLLET SHANK (Hardened and Ground Collars)
For Nos. 22-32-20-21-3 VAN NORMAN MILLERS



Part No.	Diameter of Arbor	Length Shoulder to Nut	Size of Keyway Width and Depth	Code
20-517	7/8"	7"	No keyway	ARSES
112-690	1"	3 1/2"	1/4" x 1/32"	ARONT
112-478	1"	8"	1/4" x 1/32"	ARONE
112-666	1"	12"	1/4" x 1/32"	ARONW

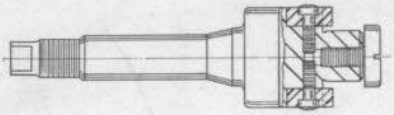
HEAVY DUTY CUTTER ARBOR on No. 13 B&S TAPER SHANK (Hardened and Ground Collars)
For Nos. 22-32-20-21-3 VAN NORMAN MILLERS



Part No.	Diameter of Arbor	Length Shoulder to Nut	Size of Keyway Width and Depth	Code
112-844	1 1/4"	8"	3/16" x 3/16"	ARACP
112-621	1 1/4"	10"	3/16" x 3/16"	AROUB
112-569	1 1/4"	12"	3/16" x 3/16"	ARUNK
20-557	1 1/4"	14"	3/16" x 3/16"	AROWT

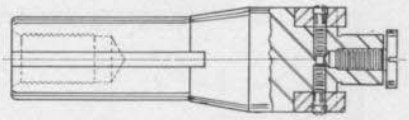
SHELL END MILL ARBORS

SHELL END MILL ARBORS ON STYLE C COLLET SHANK
For Nos. 6-12-½-10-11-2 VAN NORMAN MILLERS



Part No.	STUD Diameter	STUD Length	Code
111-779	1/2"	9/16"	DXONV
111-777	3/4"	11/16"	DXTCD
111-728	1"	11/16"	DXSRE

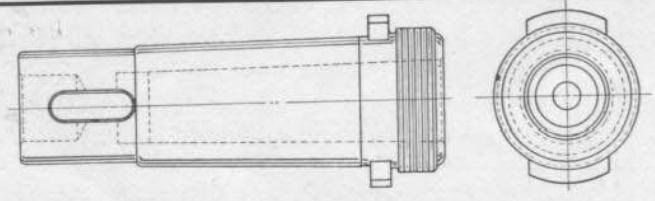
SHELL END MILL ARBORS ON STYLE 112 COLLET SHANK
For Nos. 22-32-20-21-3 VAN NORMAN MILLERS



Part No.	STUD Diameter	STUD Length	Code
20-634	1/2"	9/16"	AHTSP
20-635	3/4"	11/16"	AHTSV
112-721	1"	11/16"	AHSMO
112-820	1 1/4"	11/16"	AHOWT

TAPER SLEEVES

For Nos. 22-32-20-21-3 VAN NORMAN MILLERS

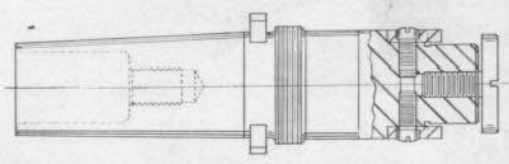


FOR TAPER SLEEVES FOR No. 2 MILLING MACHINE APPLY TO FACTORY

Part No.	TAPER Outside	TAPER Inside	Code
*112-450	No. 13 B & S	No. 9 B & S	ATSNB
*112-604	No. 13 B & S	No. 10 B & S	ATSTB
20-532	No. 13 B & S	No. 11 B & S	ATSEB
112-687	No. 13 B & S	No. 2 Morse	ATSTM
*112-688	No. 13 B & S	No. 3 Morse	ATSHM
*112-707	No. 13 B & S	No. 4 Morse	ATSFM

* Tang Drive

HEAVY DUTY SHELL END MILL ARBORS ON Nos. 13 B & S TAPER SHANK For Nos. 22-32-20-21-3 VAN NORMAN MILLERS



Part No.	STUD Diameter	STUD Length	Code
112-845	1 1/4"	11/16"	AHDON
112-838	1 1/2"	15/16"	AHRVT

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VAN NORMAN Universal MILLING MACHINES

VAN NORMAN MACHINE TOOL CO., SPRINGFIELD, MASS.