



MILLING MACHINES
BROACHING MACHINES
CUTTER SHARPENING MACHINES
OPTICAL PROJECTION PROFILE GRINDERS
FLAME HARDENING MACHINES
CUTTING FLUID

DIRECT FIELD ENGINEERING OFFICES IN THE PRINCIPAL MANUFACTURING CENTERS
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THE CINCINNATI MILLING MACHINE CO. CINCINNATI 9, OHIO. U. S. A.

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CINCINNATI



ARBORS and Accessories



THE CINCINNATI MILLING MACHINE CO. CINCINNATI 9, OHIO. U. S. A.

Publication No. M-1664-1



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PATENT NOTICE—The arbors and accessories illustrated and described in this booklet are manufactured under and protected by issued and pending United States and Foreign Patents. The design and specifications of these arbors and accessories are subject to change without notice.



ADVANTAGES of CINCINNATI ARBORS

1. They are manufactured by makers of milling machines who have over 65 years of experience in the requirements for modern milling practice.
2. They are made in a special department with special machines.
3. They are made from specially selected and tested alloy steel forgings, and heat treated for strength and toughness through processes developed by us after years of experience in the manufacture of arbors.
4. The arbor collars are hardened and ground all over—insuring long life and the maintenance of the original accuracy.
5. A single wrench is used for the draw-in bolt and arbor nut—the same wrench as used for the standardized nuts on the machine proper.
6. Every arbor and every collar is subjected to a series of most rigid tests, making it certain that the high standard for these arbors is maintained.
7. *Cincinnati arbors* can be used in your plant on any milling machine equipped with the National Standard spindle end.



Testing the assembled arbor for concentricity. The testing machine was especially designed for this operation.

Explanation of Catalog Numbers

1. The last numeral in the catalog number—3, 4, 5, 6, or 7, designates the diameter of bearing collar.

Bearing Collar Number	3	4	5	6	7
Diameter of Bearing Collar . . .	1 1/8"	2 1/8"	2 3/4"	3 3/8"	4 1/8"

2. Bearing collar supplied only where a dimension is given in the column "Diameter of Bearing Collar".



Always Order Arbors by the Code Name and Catalog Number

ARBORS

For Milling Machines Having National Standard Spindle Nose—No. 50 Series
(See page 21 for drawing of No. 50 Series taper shank)



STYLE A



STYLE B

Arbors listed under any group will interchange with machines in the same group, except where noted.

GROUP A (Inch and Millimeter Sizes)

Nos. 1 M and 2 M Plain and Universal.
Nos. 2 ML, 2 MI, and 3 MI Plain and Universal.
Nos. 2 L and 2 MH Plain and Universal.
Nos. 2 and 3 High Power Plain and Universal.
*Nos. 2, 3, and 4 Medium and High-Speed Dial Types, Plain and Universal.

Nos. 3 and 4 High Power and Dual Power Dial Types, Plain and Universal.
Nos. 3 and 4 Standard Plain and Universal.
18" Plain Manufacturing.
18" and 24" Plain Automatic.
Nos. 2-18 and 2-24 Plain Automatic.
**Nos. 2-18 and 2-24 Automatic Rise and Fall Plain Hydromatics, 3-24, 3-36, 34-36, 34-48, 35-48, 35-60, 36-72, 36-90

INCH SIZES:

Catalog Number	Diameter	Style (Lower case letters refer to notes)	Usable Length of Cutter Space	Diameter of Bearing Collar	Size of Keyway		Code Name
					Width	Depth	
50- 7/8A10	7/8	(s) A (t)	10	None	.....	.....	TENAR
50-1 A12	1	(s) A (t)	12	None	1/4	5/32	ARTWA
50-1 A15	1	(s) A	15	None	1/4	5/32	ARBAA
50-1 A18-4	1	(u) A	18	2 1/8	1/4	5/32	ATARB
50-1 B18-4	1	B	18	2 1/8	1/4	5/32	ARBFF
50-1 B24-4	1	B	24	2 1/8	1/4	5/32	ARBFA
50-1 1/4A12	1 1/4	(s) A (t)	12	None	5/16	3/16	ARBCO
50-1 1/4A15	1 1/4	(s) A	15	None	5/16	3/16	AROGU
50-1 1/4A18-4	1 1/4	(u) A	18	2 1/8	5/16	3/16	ARBRU
50-1 1/4B18-4	1 1/4	B	18	2 1/8	5/16	11/64	BETAR
50-1 1/4B24-4	1 1/4	B	24	2 1/8	5/16	3/16	ONARB
50-1 1/2B18-4	1 1/2	B	18	2 1/8	3/8	13/64	HAFAR
50-1 1/2B24-4	1 1/2	B	24	2 1/8	3/8	7/32	FORAR
50-1 1/2B30-4	1 1/2	B	30	2 1/8	3/8	7/32	ARBTY
50-1 1/2B36-4	1 1/2	B	36	2 1/8	3/8	7/32	ARGOB

MILLIMETER SIZES:

Catalog Number	Nearest Inch Size	Diameter	Style (Lower case letters refer to notes)	Usable Length of Cutter Space	Diameter of Bearing Collar	Size of Keyway		Code Name
						Width	Depth	
M22A10	50- 7/8A10	22 mm.	(s)A(t)	254 mm.	None	6 mm.	3.97 mm.	ARFUZ
M27A12	50-1 A12	27 mm.	(s)A(t)	305 mm.	None	7 mm.	4.77 mm.	ARZEP
M27A18-4	50-1 A18-4	27 mm.	(u)A	455 mm.	2 1/8	7 mm.	4.77 mm.	ARBLO
M32A18-4	50-1 1/4A18-4	32 mm.	(u)A	455 mm.	2 1/8	8 mm.	4.77 mm.	ARMET
M32B18-4	50-1 1/4B18-4	32 mm.	B	455 mm.	2 1/8	8 mm.	4.77 mm.	ARCEG
M32B24-4	50-1 1/4B24-4	32 mm.	B	610 mm.	2 1/8	8 mm.	4.77 mm.	ARALO
M40B30-4	50-1 1/2B30-4	40 mm.	B	760 mm.	2 1/8	10 mm.	4.77 mm.	ARAMM

Note: If 2" or 50 mm. arbors are required for use on any of the above machines, see page 5, under Group B.
For Notes *, **, s, t, and u—see bottom page 5.

Always Order Arbors by the Code Name and Catalog Number

ARBORS

For Milling Machines Having National Standard Spindle Nose—No. 50 Series
(See page 21 for drawing of No. 50 Series taper shank)

Arbors listed under any group will interchange with machines in the same group, except where noted.

GROUP B (Inch and Millimeter Sizes)

Nos. 4 and 5 High Power, Plain and Universal.
48" Automatic Plain.

Nos. 5 and 6 High Power Dial Type, Plain and Universal.

Nos. 5 and 6 Dual Power Dial Type, Plain.
All sizes of Plain Hydromatics except: 3-24, 3-36, 34-36, 34-48, 35-48, 35-60, 36-72, 36-90.

INCH SIZES:

Catalog Number	Diameter	Style (Lower case letters refer to notes)	Usable Length of Cutter Space	Diameter of Bearing Collar	Size of Keyway		Code Name
					Width	Depth	
50- 7/8A10	7/8	(y) A	10	None	.....	.....	TENAR
50-1 A12	1	(y) A	12	None	1/4	5/32	ARTWA
50-1 A15	1	A	15	None	1/4	5/32	ARBAA
50-1 A18-5	1	A	18	2 3/4	1/4	5/32	ARIUN
50-1 B24-5	1	B	24	2 3/4	1/4	5/32	ARATT
50-1 1/4A12	1 1/4	(y) A	12	None	5/16	3/16	ARBCO
50-1 1/4A15	1 1/4	A	15	None	5/16	3/16	AROGU
50-1 1/4A18-5	1 1/4	A	18	2 3/4	5/16	3/16	ARGEE
50-1 1/4B18-5	1 1/4	B	18	2 3/4	5/16	3/16	AREFO
50-1 1/4B24-5	1 1/4	B	24	2 3/4	5/16	3/16	FIARB
50-1 1/2B18-5	1 1/2	B	18	2 3/4	3/8	7/32	ARZUK
50-1 1/2B24-5	1 1/2	B	24	2 3/4	3/8	7/32	ARVOF
50-1 1/2B30-5	1 1/2	B	30	2 3/4	3/8	7/32	ARHAF
50-1 1/2B36-5	1 1/2	B	36	2 3/4	3/8	7/32	ARSIX
50-2 B24-5	2	(z) B	24	2 3/4	1/2	5/16	ARNYG
50-2 B30-5	2	(z) B	30	2 3/4	1/2	5/16	TOARB
50-2 B36-5	2	(z) B	36	2 3/4	1/2	5/16	ARBOS
50-2 1/2B30-6	2 1/2	(w) B	30	3 3/8	5/8	13/32	SIXAR
50-2 1/2B36-6	2 1/2	(w) B	36	3 3/8	5/8	13/32	ARBSI
50-2 1/2B30-6	2 1/2	(x) B	30	3 3/8	5/8	13/32	ARSIT
50-2 1/2B36-6	2 1/2	(x) B	36	3 3/8	5/8	13/32	ARASH

MILLIMETER SIZES:

Catalog Number	Nearest Inch Size	Diameter	Style	Usable Length of Cutter Space	Diameter of Bearing Collar	Size of Keyway		Code Name
						Width	Depth	
M40B30-5	50-1 1/2B30-5	40 mm.	B	760 mm.	2 3/4	10 mm.	4.77 mm.	ARJAB
M50B36-5	50-2 B36-5	50 mm.	B	915 mm.	2 3/4	12 mm.	4.77 mm.	ARYIF

NOTES:

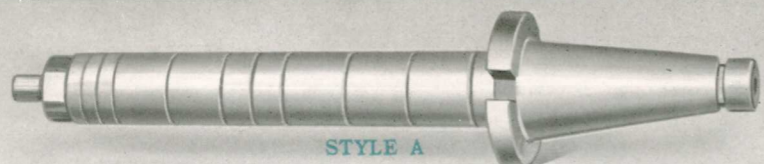
- (s) Arbor Support Bushing Adapter M-01 (see bottom page 10) must be used with "A" type arbors numbers 50- 7/8A10, 50-1A12, 50-1A15, 50-1 1/4A12, and 50-1 1/4A15 when these arbors are to be used on the No. 2 High Power, No. 3 Medium Speed and High-Speed Dial Types, No. 3 Standard, No. 3 High Power, No. 4 Medium Speed and High-Speed Dial Types, No. 4 Standard, 18" Mfg., Nos. 3 and 4 High Power and Dual Power Dial Types, and Hydromatic machines.
- (t) Cannot be used on 18" and 24" Automatic Machines. (The model prior to Nos. 2-18 and 2-24.)
- (u) Arbors 50-1A18-4 and 50-1 1/4A18-4 cannot be supported by means of pilot end in Style "A" arbor support on the ML, MI, L-Type, MH and M-Type machines.
- (w) Includes two suitable bushings for 3 3/8" diameter bearing collars for all Group "B" machines except 48" Automatic.
- (x) Includes one suitable bushing for 3 3/8" diameter bearing collar for 48" Automatic only.
- (y) 50- 7/8A10, 50-1A12, 50-1 1/4A12 require the use of arbor support bushing adapter, Catalog Number M-02 (see bottom of page 10). Cannot be used on 48" Automatics.
- (z) If these arbors are to be used on any of the machines listed on page 4 under Group A, two suitable arbor support bushings are required (supplied at extra cost).
*Medium Speed and High-Speed Dial Type Machines having two-piece braces, require the following arbors when braces are used: No. 2 Plain and Universal, 50-1 1/2B30-4; No. 3 Plain and Universal, 50-1 1/2B30-4; No. 4 Plain and Universal, 50-1 1/2B36-4.
—Machines with a colored line imprinted over the black are discontinued models.
**Arbors shorter than 18" cannot be supported in outer brace on Nos. 2-18 and 2-24 Automatic Rise and Fall Millers.

Always Order Arbors by the Code Name and Catalog Number



ARBORS

For Milling Machines Having National Standard Spindle Nose—No. 40 Series
(See page 21 for drawing of No. 40 Series taper shank)



STYLE A



STYLE B

GROUP C (Inch Sizes)

Nos. 1-12 and 1-18 Plain Automatic Milling Machines.

Catalog Number	Diameter	Style	Usable Length of Cutter Space	Diameter of Bearing Collar	Size of Keyway		Code Name
					Width	Depth	
40- 7/8A-10	7/8	A	10	None	.....	.....	ARAAZ
40-1 A-11	1	A	11	None	1/4	5/32	ARBIZ
40-1 A-15	1	A	15	None	1/4	5/32	ARMUX
40-1 1/4A-11	1 1/4	A	11	None	5/16	11/64	ARCCY
40-1 1/4A-14	1 1/4	A	14	None	5/16	11/64	ARTUM
40- 7/8B-15 1/2-3	7/8	B	15 1/2	1 7/8	.....	.....	ARDOY
40-1 B-15 1/2-3	1	B	15 1/2	1 7/8	1/4	5/32	AREER
40-1 B-18 -3	1	B	18	1 7/8	1/4	5/32	ARTIC
40-1 1/4B-15 1/2-3	1 1/4	B	15 1/2	1 7/8	5/16	11/64	ARFEB
40-1 1/4B-18 -3	1 1/4	B	18	1 7/8	5/16	11/64	ARWYZ

NOTE—Style “A” arbors in the No. 40 Series have no bearing collars.
Style “B” arbors in the No. 40 Series have one 1 7/8” diameter bearing collar.
Arbors 40-1B-18 and 40-1 1/4B-18 must be selected when braces are to be used on 1-12 and 1-18 machines.

GROUP D (Inch Sizes)

No. 0-8 Plain Automatic Milling Machine only.

Catalog Number	Diameter	Style	Usable Length of Cutter Space	Diameter of Bearing Collar	Size of Keyway		Code Name
					Width	Depth	
*40- 3/4A- 6 1/2	3/4	A	6 1/2	None	.....	.....	AROOT
40- 7/8A- 6 1/2	7/8	A	6 1/2	None	.....	.....	AREIG
40-1 A- 6 1/2	1	A	6 1/2	None	1/4	5/32	ARONA
40-1 1/4A- 6	1 1/4	A	6	None	5/16	3/16	AROAT
40- 3/4B-10-3	3/4	B	10	1 7/8	.....	.....	ANAZT
40- 7/8B-10-3	7/8	B	10	1 7/8	.....	.....	ABZUM
40-1 B-10-3	1	B	10	1 7/8	1/4	5/32	AREYB
40-1 1/4B-10-3	1 1/4	B	10	1 7/8	5/16	3/16	ARRUB

*Requires the use of special bushing No. 102350.



ARBORS AND COLLET ADAPTERS

For 36” Series Horizontal Hydro-Tel Milling Machines Only

ARBORS FOR AUXILIARY No. 50 SERIES SPINDLE (See page 21 for drawing of No. 50 Series taper shank)

Refer to Group “B” arbors listed on page 5. With a slight *alteration, those having 2 3/4” diameter bearing collar may be used.

Order by catalog number only, and specify “for use on 36” Series’ Horizontal Hydro-Tel”.

ARBORS FOR MAIN No. 60 SERIES SPINDLE (See page 21 for drawing of No. 60 Series taper shank)

With the No. 60 to 50 adapter (standard machine equipment) attached to the spindle, No. 50 Series Arbors may be used. Refer to Group “B” arbors listed on page 5. With a slight *alteration, those having 2 3/4” or 3 3/8” diameter bearing collars may be used.

Order by catalog number only, and specify “for use on 36” Series Horizontal Hydro-Tel”.

In addition, the following group of arbors are now carried in stock:

GROUP E (Inch Sizes)

Catalog Number	Diameter	Style	Usable Length of Cutter Space	Diameter of Bearing Collar	Size of Keyway		Code Name
					Width	Depth	
50-1 1/2B40-5	1 1/2	B	40	2 3/4	3/8	7/32	ARDEE
50-2 B40-5	2	B	40	2 3/4	1/2	5/16	ARIXE
50-2 B46-5	2	B	46	2 3/4	1/2	5/16	ARKOO
50-2 1/2B40-6	2 1/2	B	40	3 3/8	5/8	13/32	ARLAL
50-2 1/2B46-6	2 1/2	B	46	3 3/8	5/8	13/32	ARLOG
60-3 B36-7	3	B	36	4 1/8	3/4	29/64	ARZAY
60-3 B58-7	3	B	58	4 1/8	3/4	29/64	ARZOT

SHELL END MILL ARBORS—STYLE “C”

Refer to the No. 50 Series Shell End Mill Arbors tabulated on page 11. With a slight *alteration, these arbors may be used.

Order by catalog number only, and specify “for use on 36” Series Horizontal Hydro-Tel”.

COLLET ADAPTER—STYLE “E”

Refer to the No. 50 Series Collet Adapters tabulated on page 14. With a slight *alteration, these adapters may be used.

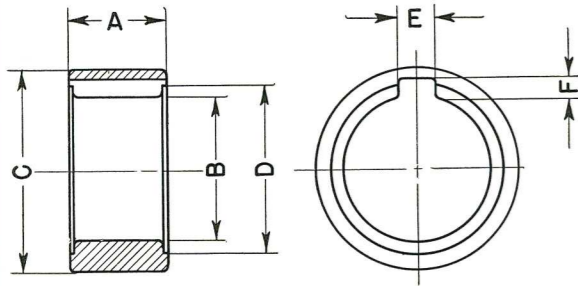
Order by catalog number only, and specify “for use on 36” Series Horizontal Hydro-Tel”.

*NOTE—The alterations mentioned above are required so that the driving flange will fit the No. 50 Series Quick Change Adapter.



ARBOR COLLARS

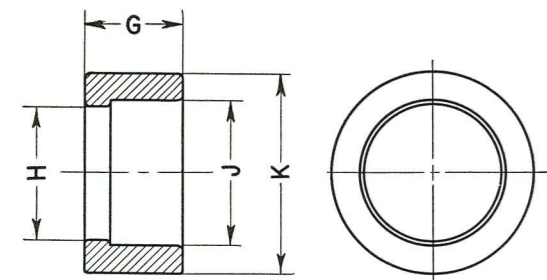
SPACING COLLARS—For All Milling Machine Arbors



Nom. Size of Arbor	Part Number	Length A	Dia. of Hole B	Outside Dia. C	Cobore Dia. D	Keyway	
						Width E	Depth F
3/4"	4104	1/2"	3/4"	1.175"	7/8"	.....	.....
	4106	1"		1.178"		.....	.....
	4105	2"		.....		.....
7/8"	3644	1/2"	7/8"	1.300"	1"	.....	.....
	3645	1"		1.303"		.....	.....
	3646	2"		.....		.....
1"	3647	1/2"	1"	1.612"	1 1/4"	.265"	1/8"
	3648	1"		1.615"		.270"	.....
	3649	2"		.....		.....
1 1/4"	3651	1/2"	1 1/4"	1.852"	1 1/2"	.327"	5/32"
	3652	1"		1.855"		.332"	.....
	3653	2"		.....		.....
1 1/2"	3655	1/2"	1 1/2"	2.102"	1 3/4"	.390"	3/16"
	3656	1"		2.105"		.395"	.....
	3657	2"		.....		.....
2"	3659	1/2"	2"	2.727"	2 1/4"	.515"	15/64"
	3660	1"		2.730"		.520"	.....
	3661	2"		.....		.....
2 1/2"	3663	1/2"	2 1/2"	3.352"	2 3/4"	.640"	9/32"
	3664	1"		3.355"		.645"	.....
	3665	2"		.....		.....

FRONT COLLARS

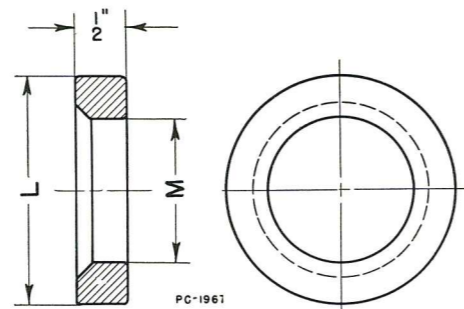
For All Milling Machine Arbors



Nom. Size of Arbor	Part Number	Length G	Dia. of Hole H	Dia. of Hole J	Outside Dia. K
3/4"	.....	.....	.....	.....	.....
7/8"	.....	.....	.....	.....	.....
1"	.....	.....	.....	.....	.....
1 1/4"	3677	1"	1 1/8"	1 1/4"	1.852" 1.855"
1 1/2"	3678	1"	1 3/8"	1 1/2"	2.100" 2.103"
2"	3679	1"	1 5/8"	2"	2.727" 2.730"
2 1/2"	3680	1 1/8"	1 3/4"	2 1/2"	3.352" 3.355"

BACK COLLARS

For All Milling Machine Arbors



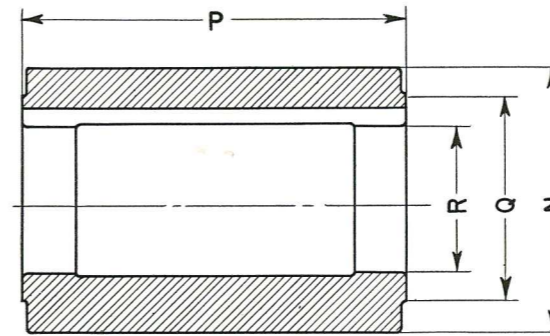
Nom. Size of Arbor	Part Number	Outside Dia. L	Dia. of Hole M
3/4"	4103	1.487" 1.490"	3/4"
7/8"	3681	1.487" 1.490"	7/8"
1"	3682	1.799" 1.802"	1"
1 1/4"	3683	2.102" 2.105"	1 1/4"
1 1/2"	3684	2.352" 2.355"	1 1/2"
2"	3685	2.984" 2.987"	2"
2 1/2"	3686	3.602" 3.605"	2 1/2"



ARBOR COLLARS

BEARING COLLARS

For National Standard Taper Shank Arbors

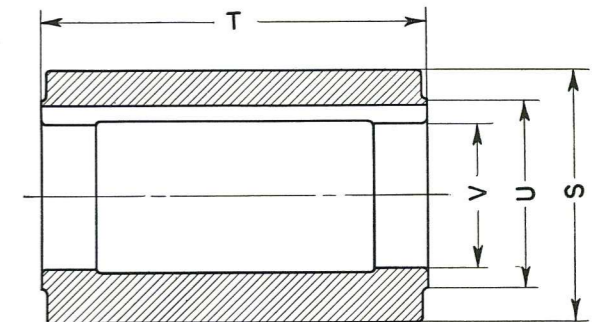


Nom. Size of Arbor	Part No.	Outside Dia. N	Length P	Face Dia. Q	Dia. of Hole R	Keyway	
						Width	Depth
3/4"	4166	1.8740"	3"	1 3/8"	.7500"	.....	.....
		1.8743"			.7505"	.....	.....
7/8"	4112 4032	1.8740"	3"	1 3/8"	.8750"	.....	.....
		1.8743"	4"		.8755"	.....	.....
1"	4108	1.8740"	3"	1 3/8"	1.0000" 1.0005"	.265"	1/8"
	3667	1.8743"	4"			.....	.....
	3668	2.1235"	4"			.....	.....
		2.1238"				.....	.....
		2.7485"				.....	.....
3788	2.7488"	4"	.....	.....	
1 1/4"	4107	1.8740"	3"	1 7/8"	1.2500" 1.2505"	.327"	5/32"
	3669	1.8743"	4"			.....	.....
	3670	2.1235"	4"			.....	.....
		2.1238"				.....	.....
3671	2.7485"	4"	.....	.....	
1 1/2"	3672	2.1235"	4"	2 1/8"	1.5000" 1.5005"	.390"	3/16"
	3673	2.1238"	4"			.....	.....
		2.7485"				.....	.....
3673	2.7488"	4"	.....	.....	
2"	3674	2.7485"	4"	2 3/4"	2.0000" 2.0005"	.515"	15/64"
	3675	2.7488"	4"			.....	.....
		3.3735"				.....	.....
3675	3.3738"	4"	.....	.....	
2 1/2"	3676	3.3735"	4"	.....	2.5000" 2.5005"	.640"	9/32"
		3.3738"				.645"

BEARING COLLARS

For B. & S. Taper Shank Arbors

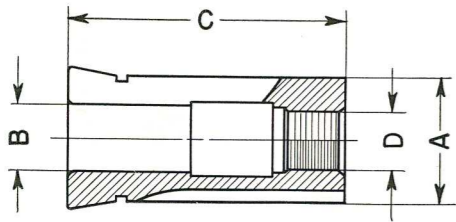
Nom. Size of Arbor	Part No.	Outside Dia. S	Length T	Face Dia. U	Hole Dia. V	Keyway	
						Width	Depth
1"	56753	1.9990" 1.9993"	4"	.....	1.0000" 1.0005"	.265"	1/8"
	56754	2.3735" 2.3738"		1 1/8"		.270"	.....
1 1/4"	56756	1.9990" 1.9993"	4"	.....	1.2500" 1.2505"	.327"	5/32"
	56757	2.3735" 2.3738"		1 1/8"		.....	.....
		56758				2.6235" 2.6238"	1 1/8"
1 1/2"	56759	2.3735" 2.3738"	4"	.....	1.5000" 1.5005"	.390"	3/16"
	56760	2.6235" 2.6238"		1 1/8"		.....	.....
2"	56683	2.6235" 2.6238"	4"	.....	2.0000" 2.0005"	.515" .520"	3/16"
2 1/2"	56761	3.2485"	4"	.....	2.5000" 2.5005"	.640"	7/32"
		3.2488"		.645"		.....	.....





BUSHINGS

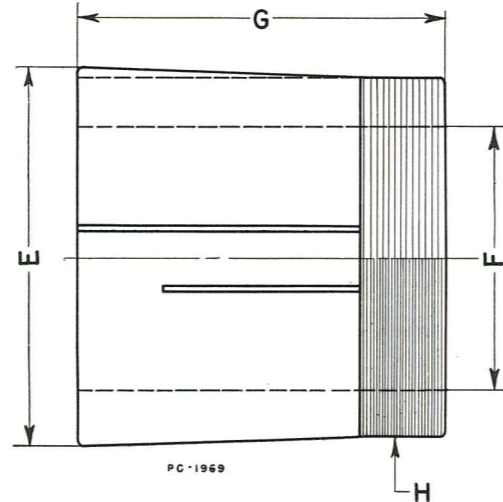
ARBOR SUPPORT BUSHINGS



Part Number	Outside Dia. A	Hole Dia. B	Length C	Threaded Hole D
3695	1 5/16"	.7185" .7190"	2 7/8"	5/8"-11 N. C.
4037	1 5/16"	.7185" .7190"	2 1/4"	5/8"-11 N. C.

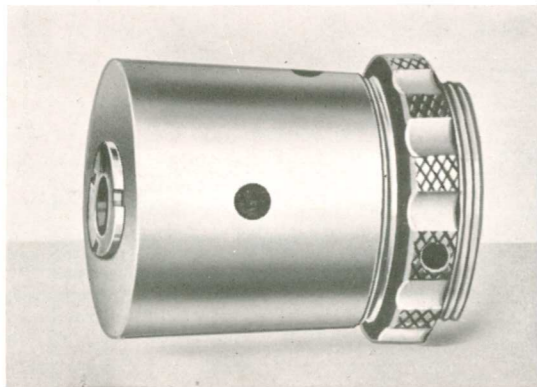
ARBOR SUPPORT ADJUSTABLE BUSHINGS

Outside Dia. Bearing Collar	Part Number Bushing	Outside Dia. E	Hole Dia. F	Length G	N. S. Threads H
1 7/8"	*4039†	2 1/2"	1.8750" 1.8757"	3 1/4"	2 1/4"-16
	**3696†	3 1/4"	1.8750" 1.8757"	3 13/16"	3"-16
2 1/8"	3697†	3 1/4"	2.1250" 2.1257"	3 13/16"	3"-16
2 3/4"	**3698†	3 1/4"	2.7500" 2.7510"	3 13/16"	3"-16
	3699†	3 3/8"	2.7500" 2.7510"	3 13/16"	3 3/4"-16
3 3/8"	**3700†	3 3/8"	3.3710" 3.3750"	3 13/16"	3 3/4"-16

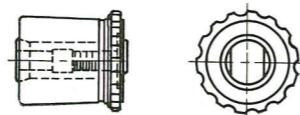


*To be used with a No. 40 spindle taper arbor.
**These bushings are special and are to be used with arbors which are larger than standard equipment.
†Includes adjusting nut.

ARBOR SUPPORT BUSHING ADAPTER... Style O



Arbor Support Bushing Adapters enable you to use Style "A" arbors on machines which do not include a Style "A" arbor support with the standard equipment.



Catalog Number	Diameter, Large End	Part Numbers of Parts Included					Code Name
		Adapter	Bushing	Nut	Washer	Screw	
M-01	3.250	3704	3695	3972	128	3692	ADABU
M-02	3.969	109942	3695	3702	128	3692	AXORT

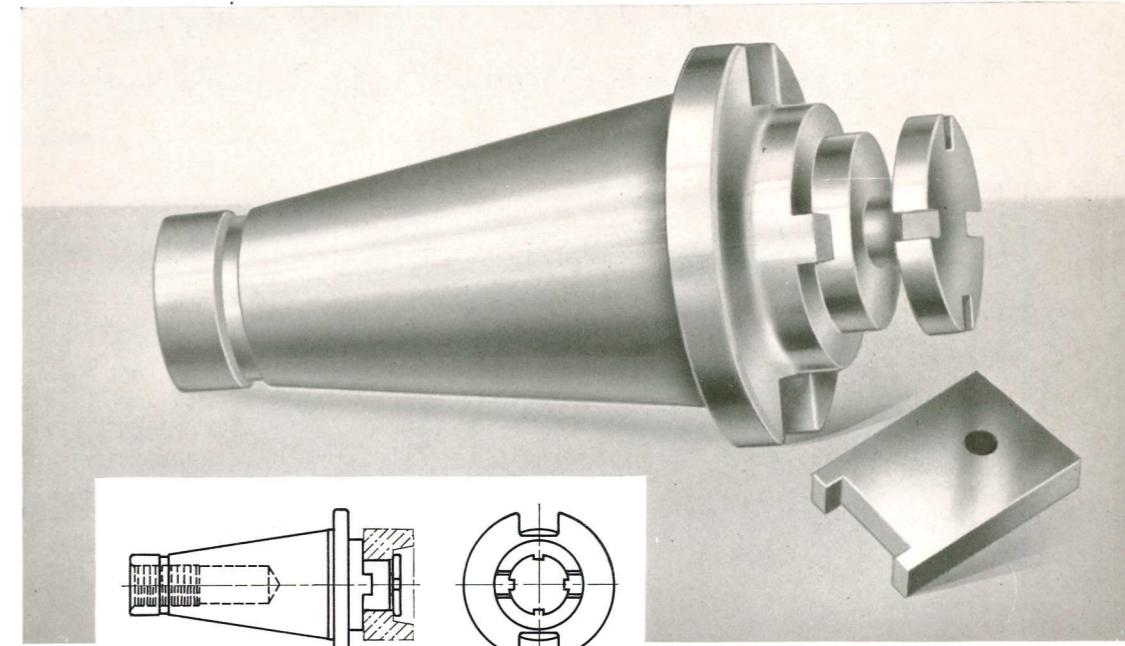
Adapter Catalog No. M-01 is furnished as standard equipment on the Nos. 3 and 4 Medium Speed and High-Speed Dial Types, Nos. 3 and 4 High Power and Dual Power Dial Types (except vertical machines) and must always be used with these machines when Style "A" arbors without bearing collars are used. M-02 is furnished as standard equipment on the Nos. 5 and 6 High Power and Dual Power Dial Types (except vertical machines).



SHELL END MILL ARBORS... No. 50 Series... Style C

SHELL END MILL AND QUICK CHANGE SHELL END MILL ARBORS No. 40 Series.. Style C

For Milling Machines Having National Standard Spindle Nose—
Nos. 40 and 50 Series



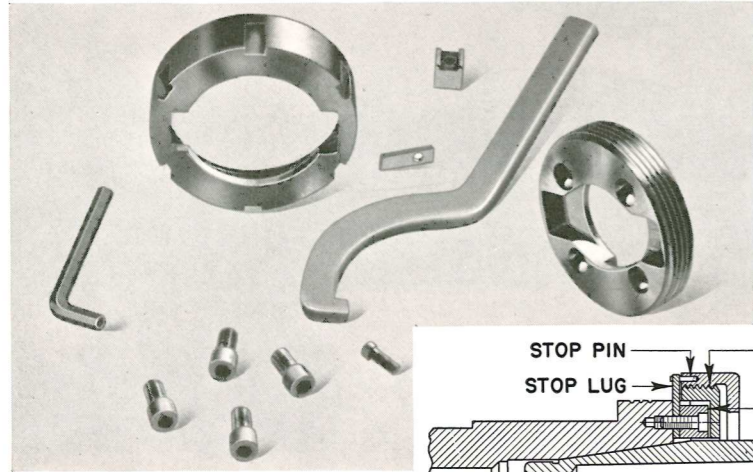
Spindle Series	Diameter Range of End Mills	Stud Diam.	Catalog Number	Part Numbers			Code Name
				Wrench	Screw	Collar	
Inch Sizes No. "50"—For All Standard Spindle Millers Except Nos. 0-8, 1-12, 1-18, and Four-Spindle 360-Degree Automatic Profiler (See Note 1 Below)	1 1/4-1 1/2	1/2	50- 1/2C 5/8	.....	3714	.....	SHEMA
	1 3/4-2	3/4	50- 3/4C 5/8	.....	3715	.....	SEMCO
	2 1/4-2 1/2-2 3/4	1	50-1 C 7/8	.....	3716	3749	SHEPU
	3-3 1/2	1 1/4	50-1 1/4C 7/8	3705	3717	3751	SHEHI
	4-4 1/2-5	1 1/2	50-1 1/2C 7/8	3706	3718	3753	SHEBY
	5 1/2-6	2	50-2 C 7/8	3707	3719	3755	SEMOR
Inch Sizes No. "40"—For Nos. 0-8, 1-12, 1-18, and Four-Spindle 360-Degree Automatic Profiler (See Note 2 Below)	1 1/4-1 1/2	1/2	40- 1/2C 3/4	.....	3714	107043	ARESY
	1 3/4-2	3/4	40- 3/4C 3/4	.....	3715	107045	ARITH
	2 1/4-2 1/2-2 3/4	1	40-1 C 1 1/8	.....	3716	102601	ARETO
	3-3 1/2	1 1/4	40-1 1/4C 1 1/8	3705	3717	107041	SELIA
	4-4 1/2-5	1 1/2	40-1 1/2C 1 1/8	3706	3718	106662	ARAUW
Millimeter Sizes No. "50"—For all Standard Spindle Millers Except Nos. 0-8, 1-12, 1-18, and Four-Spindle 360-Degree Automatic Profiler (See Note 3 Below)	1 1/4-1 1/2	13mm.	50M-13C 5/8	.....	3714	.....	MEARB
	1 3/4-2	16mm.	50M-16C 5/8	.....	3715	.....	MEBOR
	2 1/4-2 1/2-2 3/4	27mm.	50M-27C 7/8	.....	3716	3749	MEMAR
	3-3 1/2	32mm.	50M-32C 7/8	3705	3717	3751	METBA
	4-4 1/2-5	40mm.	50M-40C 7/8	3706	3718	3753	METMI
	5 1/2-6	50mm.	50M-50C 7/8	3707	3719	3755	METSH
Millimeter Sizes No. "40"—For Nos. 0-8, 1-12, 1-18, and Four-Spindle 360-Degree Automatic Profiler (See Note 3 Below)	1 1/4-1 1/2	13mm.	40M-13C 3/4	.....	3714	107043	MESBO
	1 3/4-2	16mm.	40M-16C 3/4	.....	3715	107045	MESWE
	2 1/4-2 1/2-2 3/4	27mm.	40M-27C 1 1/8	.....	3716	102601	MESON
	3-3 1/2	32mm.	40M-32C 1 1/8	3705	3717	107041	MESFA
	4-4 1/2-5	40mm.	40M-40C 1 1/8	3706	3718	106662	MESTR

- NOTES—1. Shell End Mill Arbors listed under the No. 50 Series may also be used on 16" Vertical and 36" Horizontal Hydro-Tel Milling Machines. Order must specify machines on which arbors will be used.
2. The "40" Series Shell End Mill Arbors listed also fit Quick Change Adapter No. NS-H4 and Four Spindle 360-Degree Automatic Profiler with built-in quick change feature.
3. Metric size Shell End Mill Arbors are not kept in stock. When ordering them, print of cutter to be used with the arbor must accompany the order.
Chrome nickel heat-treated screws for holding shell end mill on arbor are furnished with all arbors. Wrenches are furnished with arbors 50-1 1/4C 7/8, 50-1 1/2C 7/8, 50-2C 7/8, 40-1 1/4C 1 1/8 and 40-1 1/2C 1 1/8.

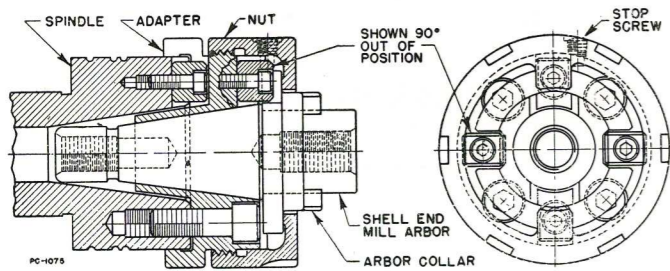
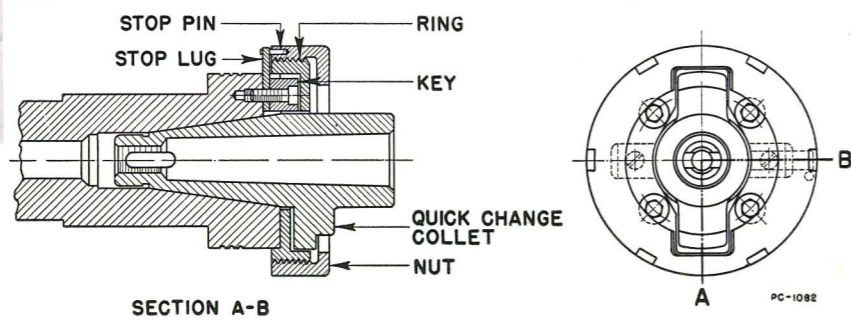


QUICK CHANGE ADAPTERS

For Milling Machines Having National Standard Spindle Nose—Nos. 40 and 50 Series



FOR No. 50 SERIES



FOR No. 40 SERIES

For all CINCINNATI Milling Machines, having No. 50 Standard spindle nose, listed on pages 4 and 5.

Complete Adapter. Catalog No. NS-H5. Code Name—ADACO
Includes adapter ring, nut, special key, stop lug, spanner wrench, screw, four ring screws, and socket wrench.

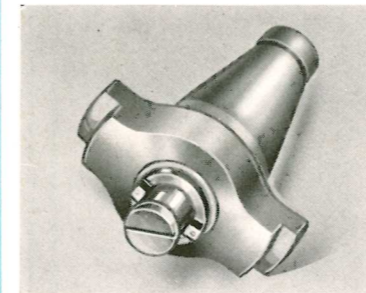
For CINCINNATI Nos. 1-12 and 1-18 Plain Automatic Milling Machines (No. 40 Standard Spindle Nose).

Complete Adapter. Catalog No. NS-H4. Code Name—QUIAD
Includes adapter, adapter nut, screws, driving keys, and spanner wrench.



QUICK CHANGE ARBORS AND COLLETS

For Milling Machines Having National Standard Spindle Nose—No. 50 Series



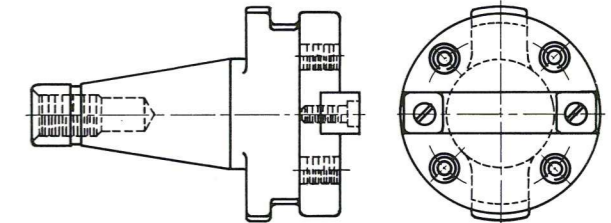
QUICK CHANGE SHELL END MILL ARBORS—No. 50 SERIES

(Requires use of Quick Change Adapter, page 12)
(See page 11 for No. 40 Spindle Series)

Catalog Number	Diameter Mills	Stud Diameter	Code Name
50- 1/2 FC 5/8	1 1/4-1 1/2	1/2	ARABB
50- 3/4 FC 5/8	1 3/4-2	3/4	ARDUI
50-1 FC 7/8	2 1/4-2 1/2-2 3/4	1	ARSHE
50-1 1/4 FC 7/8	3-3 1/2	1 1/4	ARTTA
50-1 1/2 FC 7/8	4-4 1/2-5	1 1/2	ARICK
50-2 FC 1/8	5 1/2-6	2	AREMI

QUICK CHANGE FACE MILL ARBOR No. 50 SERIES

(Requires use of Quick Change Adapter, page 12)



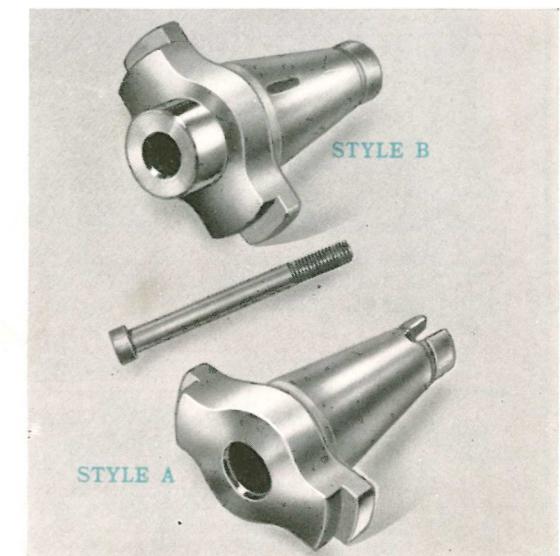
Catalog No. 50-5 1/8 FC Stud Diameter. 5 1/16"
Diameter Face Mills. 7" to 12" Code Name. ARFAC

QUICK CHANGE COLLETS—No. 50 SERIES

(Requires use of Quick Change Adapter, page 12)
(See Page 14 for No. 40 Spindle Series)

Catalog Number	Style	Inside Taper	Code Name
50-NS-FEB 7	B	No. 7 B. & S.	COQUI
50-NS-FEB 9	B	No. 9 B. & S.	COSEM
50-NS-FEB 10	*A	No. 10 B. & S.	COSBE
50-NS-FEB 11	B	No. 11 B. & S.	COTTO
50-NS-FEM 2	B	No. 2 Morse	CORIC
50-NS-FEM 3	B	No. 3 Morse	COROB
50-NS-FEM 4	B	No. 4 Morse	CODDE

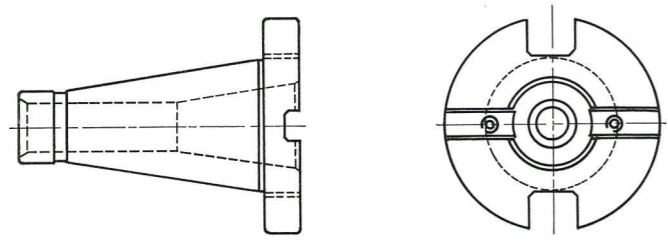
*Style A does not have nose extending beyond flange face.





COLLET ADAPTERS

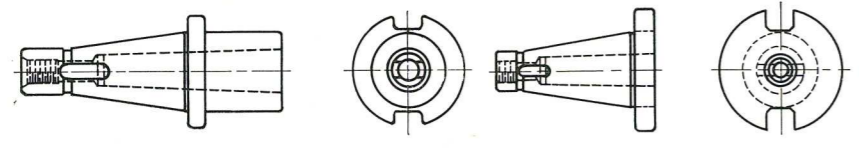
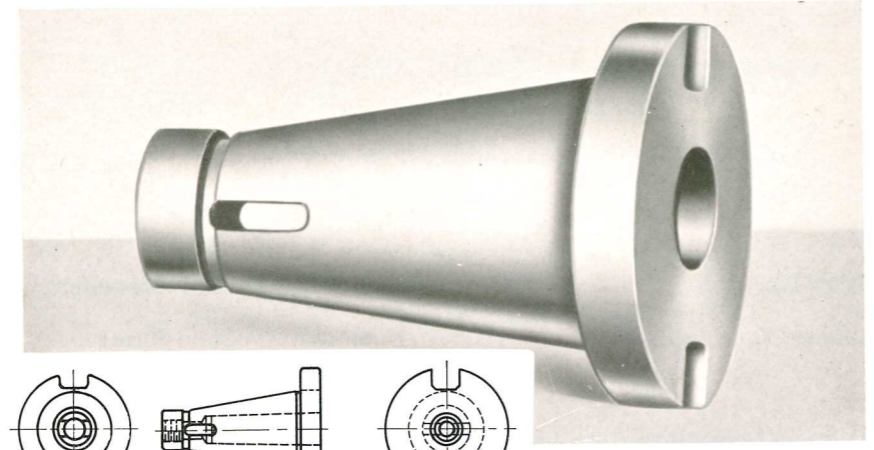
For Milling Machines Having National Standard Spindle Nose—No. 50 Series



Reducing No. 50 to 40 Spindle Series

Catalog No. 50-NS-40. Code Name—COAFD.

For Milling Machines Having National Standard Spindle Nose—Nos. 40 and 50 Series



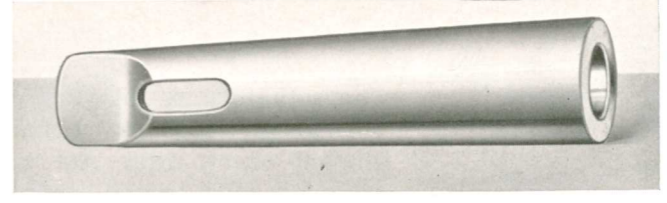
Spindle Series	Inside Taper	Catalog Number	Code Name
No. "50"—For All Standard Spindle Millers Except Nos. 0-8, 1-12, 1-18, and Four-Spindle 360-Degree Automatic Profiler (See Note 1 Below)	9 B&S	50-NSE-9	COLAY
	*9 B&S	50-NSE-9	CONSE
	4 Morse	50-NSE-4	CODAP
	10 B&S	50-NSE-10	COLAE
	*10 B&S	50-NSE-10	COLNE
No. "40"—For Nos. 0-8, 1-12, 1-18, and Four-Spindle 360-Degree Automatic Profiler. (See Note 2 Below)	9 B&S	40-NSE-9	CADAP
	*9 B&S	40-NSE-9	DAPTE
	4 Morse	40-NSE-4	MORES
	7 B&S	40-NSE-7	CAYYU
	5 B&S	40-NSE-5	ADCOL

*Specify with or without tang drive.
 NOTES—1. Collet Adapters, Style E listed under the No. 50 Series may also be used on 16" Vertical and 36" Horizontal Hydro-Tel Milling Machines. Order must specify machines on which adapters will be used.
 2. The "40" Series Collet Adapters listed also fit Quick Change Adapter No. NS-H4 and Four-Spindle 360-Degree Automatic Profiler with built-in quick change feature.



REDUCING COLLETS

With Collet Adapters and suitable Reducing Collets, small cutters having B. & S. or Morse tapers may be used on machines having the standard spindle nose with non-sticking taper hole.



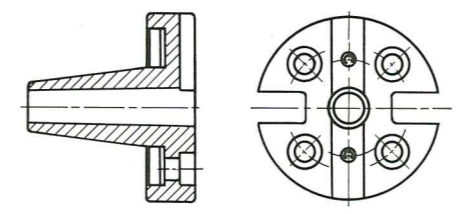
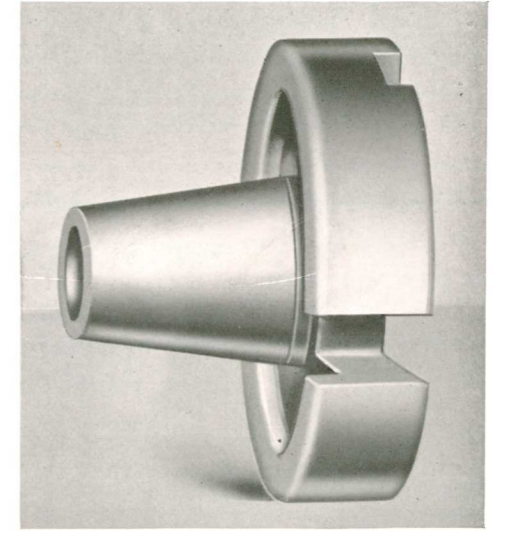
B. & S. Taper—Style J Morse Taper—Style K

Catalog Number	Outside Taper	Inside Taper	Code Name
J9-4	9 B&S	4 B&S	COLJA
J9-5	9 B&S	5 B&S	COLFI
J9-7	9 B&S	7 B&S	COLEV
K4-1	4 Morse	1 Morse	COLCO
K4-2	4 Morse	2 Morse	COLBU
K4-3	4 Morse	3 Morse	COBRY

ARBOR ADAPTERS... Style D

For Milling Machines Having National Standard Spindle Nose—Nos. 40 and 50 Series

Arbor Adapters, Style D, are furnished in order that you may use old style Nos. 10, 11, and 12 B. & S. taper arbors in machines having the standard non-sticking spindle end.



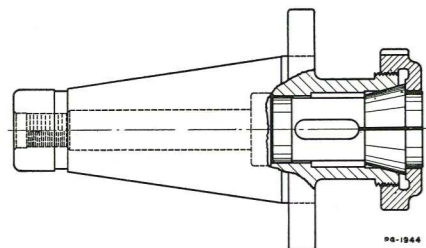
Spindle Series	Catalog Number	Inside Taper	Extends Beyond Spindle Nose	Part Numbers		Code Name
				Screw	Wrench	
No. "50"—All Standard Millers Except Nos. 1-12, 1-18 and 0-8	50-NSD-10	10 B&S	1	3689	3688	ARDAP
	50-NSD-11	11 B&S	1 1/2	3690	3688	ARBAD
	50-NSD-12	12 B&S	1 7/8	3691	3688	ADDEE
"40"—Nos. 1-12 and 1-18	40-NSD-9	9 B&S	1	79715	3985	ADPAR

Screws listed above are to be used to fasten adapters to spindle nose. Two keys with attaching screws and four chrome nickel heat-treated screws will be furnished with each adapter unless otherwise specified on order. Wrench 3688 or 3985 will be furnished with each adapter. This is a special wrench and must be used to fasten screws.



SPRING CHUCK AND SPRING COLLETS

For Milling Machines Having National Standard Spindle Nose— Nos. 40 and 50 Series
and for use in Workhead Spindle of No. 2 Cutter Grinder*



SPRING CHUCK

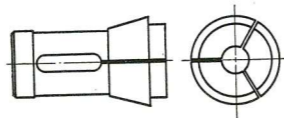
The spring chuck with interchangeable spring collets provides a quick and accurate method for holding straight shank drills and end mills. The cap nut seats the collet in the taper bore of the adapter and firmly clamps the tool shank in position.

	Part Numbers of Parts Included			Code Name (complete)
	Spindle Chuck	Nut	Wrench	
For all CINCINNATI Milling Machines, having No. 50 Standard spindle nose, listed on pages 4 and 5.	127581	127580	120380	CHULE
For CINCINNATI Nos. 0-8, 1-12, and 1-18 Plain Automatic Milling Machines (No. 40 Standard spindle nose).	128891	127580	120380	CHUPA

*When this item is supplied for use on our No. 2 Cutter and Tool Grinder a draw-in bolt (Part No. 130224) must be used (supplied at extra cost). Only the No. 50 Taper Spring Chuck can be used.

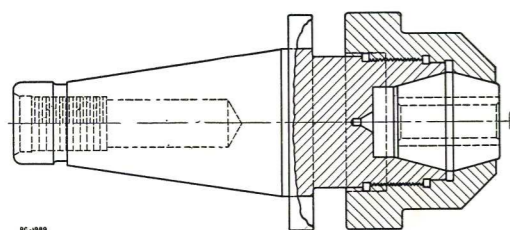
SPRING COLLETS

Size	Part No.	Size	Part No.	Size	Part No.
1/8"	121658	3/8"	121662	3/4"	121666
3/8"	121659	7/8"	121663	7/8"	121667
1/4"	121660	1/2"	121664	1"	121668
5/8"	121661	5/8"	121665		



SPINDLE CHUCK AND COLLETS

For 16" and 28" Series Vertical Hydro-Tel Milling Machines



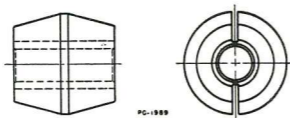
SPINDLE CHUCK

The spindle chuck provides a quick and easy method for changing cutters when using straight shank end mills.

Part Numbers of Parts Included			Code Name (complete)
Spindle Chuck	Nut	Wrench	
113524	105597	103298	CHUBB

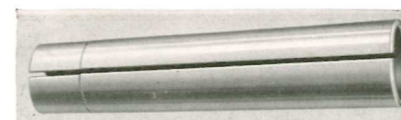
COLLETS

Size	Part No.	Size	Part No.	Size	Part No.
1/4"	105587	5/8"	105590	1"	105593
3/8"	105588	3/4"	105591	1 1/8"	105594
1/2"	105589	7/8"	105592		

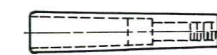


COLLETS

For Milling Machines with B. & S. Taper Hole in Spindle



STYLE CI



STYLE ST-Threaded



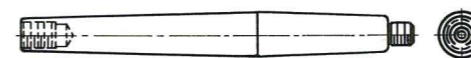
STYLE ST

Catalog Number	Style	Outside B. & S. Taper	Inside B. & S. Taper	Small End	Code Name
451	ST	7	4	Plain	DRAYO
452	ST	7	5	Plain	EWOR
453	ST	9	5	Threaded	DRAM
454	ST	9	7	Threaded	DRIFT
455	ST	10	7	Threaded	DRUA
456	CI	10	9	Plain	DRUID
457	ST	11	7	Threaded	DWARF
458	CI	11	9	Plain	DRYUD
459	CI	11	10	Plain	ECLAT
460	CI	12	9	Plain	DUMB
461	CI	12	10	Plain	DYZZ
462	CI	12	11	Plain	DORIL
463	ST	14	10	Plain	ECOLL
464	ST	14	11	Plain	EFIO
465	ST	14	12	Plain	ENUI
466	ST	10	5	Threaded	COUSA

The CI and ST style collets can be used on any of our machines having spindle holes of corresponding sizes, regardless of the style of spindle end.

The CI collets, which are suitable for the larger machines, are slit lengthwise, which allows a more intimate contact between the collet, the spindle, and the arbor, and also facilitates their easy removal after the arbor has been taken out.

SCREW CUTTER ARBORS—WITH 10 B. & S. TAPER



We carry in stock arbors for machines with No. 10 B. & S. Taper. The end for cutters has 3/8"-24 right-hand thread.
Code Name.....ACE

FLY CUTTER ARBORS FOR MILLING MACHINES

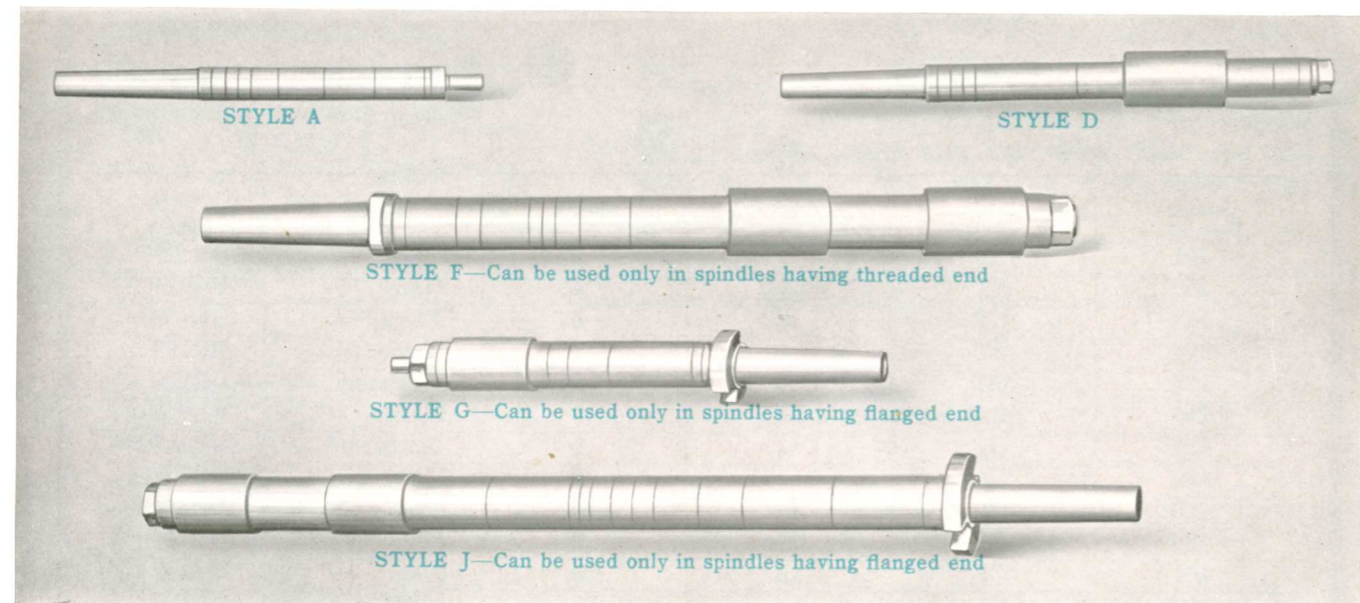


We carry the following sizes in stock. A piece of tool steel 3/4" square by 3" long is furnished with each arbor.

Catalog Number	Size of Hole	No. of Taper	Code Name
401	1 3/16" Sq.	10	ASP
402	1 3/8" Sq.	11	ANT
404	1 3/16" Sq.	No. 50 Series	ARXCU

ARBORS

For Cincinnati Milling Machines Having B. & S. Taper Hole in Spindle



ARBORS FOR THREADED SPINDLE—INCH SIZES

Arbors listed under any group will interchange with machines in the same group, except where noted	Cat. No.	Diam.	Style	Usable Length of Cutter Space	Diam. of Bearing Collar	Size of Keyway		B. & S. Taper	Code Name
						Width	Depth		
GROUP K Nos. 1 and 2 Cone Type. No. 2 High Power. Plain and Universal. Threaded Spindle.	1010 1011 1041 1043	7/8 1 1 1 1/4	A* A D D	8 8 14 1/2 14 1/2	..... ..... 2 2	..... 1/4 1/4 1/8	..... 5/32 5/32 5/16	10 10 10 10	ARNAU ARLEV ARKEY ARSPI
GROUP L No. 3 Cone Type. Plain and Universal. Threaded Spindle.	1016 1053 1055 1056	1 1 1 1/4 1 1/2	A D D D	10 18 1/2 18 1/2 18 1/2	..... 2 3/8 2 3/8 2 3/8	1/4 1/4 1/8 3/8	5/32 5/32 5/16 7/32	11 11 11 11	ARPPA ARBDE ARBYV ARQUO
GROUP M No. 3 Std. and High Power. No. 4 Standard. Plain and Universal Threaded Spindle.	1059 1057	1 1/4 1 1/2	F F	29 29	2 3/8 2 3/8	5/16 5/8	3/16 7/32	11 11	ARSTA ARHIP
GROUP N No. 4 Cone Type. Nos. 4 and 5 High Power. Plain and Universal. Threaded Spindle.	1090 1066 1067 1069	1 1 1/4 1 1/2 2	A F F F	10 26 26 26	..... 2 5/8 2 5/8 2 5/8	1/4 5/16 5/8 1/2	5/32 5/16 5/32 5/16	12 12 12 12	ARNBY ARNOW ARROG ARTYP

*See note, page 19.

Always Order Arbors by the Code Name and Catalog Number

ARBORS

For Cincinnati Milling Machines Having B. & S. Taper Hole in Spindle

ARBORS FOR FLANGED SPINDLE—INCH SIZES

Arbors listed under any group will interchange with machines in the same group, except where noted	Cat. No.	Diam.	Style	Usable Length of Cutter Space	Diam. of Bearing Collar	Size of Keyway		B. & S. Taper	Code Name
						Width	Depth		
GROUP P No. 1 M. No. 2 M. Plain and Universal. Flanged Spindle.	1112 1119 1120	1 1 1 1/4	A J† J†	12 21 21	..... 2 3/8 2 3/8	1/4 1/4 1/8	5/32 5/32 5/16	14 14 14	ARMON ARMTU ARMZI
GROUP R No. 2 High Power No. 3 Cone Type. No. 3 Standard. No. 3 High Power No. 4 Standard. Plain and Universal. Flanged Spindle, 11 B.&S. Taper.	1016 1081 1087 1083 1084 1085 1086	1 1 1/4 1 1 1/4 1 1/2 1 1/4 1 1/2	A G J J J J J	10 12 18 1/2 18 1/2 18 1/2 29 29	..... 2 3/8 2 3/8 2 3/8 2 3/8 2 3/8 2 3/8	1/4 1/8 1/4 1/8 3/8 1/8 3/8	5/32 5/16 5/32 5/16 5/16 5/16 5/32	11 11 11 11 11 11 11	ARPPA ARCUS ARYDD ARWER ARTAB AROTE ARHOK
GROUP S Nos. 2 and 3 High Power. No. 3 Standard. No. 4 Standard. Plain and Universal. Flanged Spindle, 14 B.&S. Taper.	1112 1123 1104 1105 1107	1 1 1 1/4 1 1/2 2	A J J J J	12 21 27 27 27	..... 2 5/8 2 5/8 2 5/8 2 5/8	1/4 1/4 1/8 3/8 1/2	5/32 5/32 5/16 5/8 5/32	14 14 14 14 14	ARMON AREFT AROSP ARGAN ARHEX
GROUP T No. 4 Cone Type. No. 4 High Power. No. 5 High Power. Plain and Universal. Flanged Spindle, 12 B.&S. Taper.	1090 1091 1093 1094 1101 1103	1 1 1/4 1 1/4 1 1/2 1 1/2 2	A G J J J J	10 12 26 26 36 36	..... 2 5/8 2 5/8 2 5/8 2 5/8 2 5/8	1/4 5/16 1/8 3/8 3/8 1/2	5/32 5/16 5/16 5/8 5/8 5/16	12 12 12 12 12 12	ARNBY ARJUX ARKIR ARLMA ARTES ARINC
GROUP U No. 4 High Power. No. 5 High Power. Plain and Universal. Flanged Spindle, 14 B.&S. Taper.	1104 1105 1107 1108 1110 1111	1 1/4 1 1/2 2 1 1/2 2 2 1/2	J J J J J J†	27 27 27 38 38 38	2 5/8 2 5/8 2 5/8 2 5/8 2 5/8 3 1/4	5/8 1/2 1/2 3/8 1/2 5/8	5/16 5/32 5/16 7/32 5/16 5/32	14 14 14 14 14 14	AROSP ARGAN ARHEX ARAND ARVAR ARWAK
GROUP W 18" Plain Manufacturing. Flanged Spindle, 10 B.&S. Taper.	1141 1143	1 1 1/4	J† J†	14 1/2 14 1/2	2 2	1/4 1/8	5/32 5/16	10 10	ARXEL ARYSE
GROUP X 18" and 24" Automatic, Plain. Flanged Spindle, 11 B.&S. Taper.	1087 1083 1084	1 1 1/4 1 1/2	J J J	18 1/2 18 1/2 18 1/2	2 3/8 2 3/8 2 3/8	1/4 1/8 3/8	5/32 5/16 5/32	11 11 11	ARYDD ARWER ARTAB
GROUP Y 48" Automatic, Plain. Flanged Spindle, 14 B.&S. Taper.	1104 1105 1107	1 1/4 1 1/2 2	J J J	27 27 27	2 5/8 2 5/8 2 5/8	5/16 3/8 1/2	3/16 5/32 5/16	14 14 14	AROSP ARGAN ARHEX

*NOTE—When it is necessary to use a 7/8 arbor on the larger machines we recommend this No. 1010 Arbor in connection with standard collets as follows:

Nos. 2 and 3 H. P., No. 3 Standard, No. 4 Standard and Cone Type machines with flanged or threaded spindle nose having No. 11 B. & S. taper hole, use 459 Collet.

Nos. 4 and 5 machines with threaded spindle nose and No. 4 with flanged spindle nose having No. 12 B. & S. taper hole, use 461 Collet.

Nos. 2, 3, 4 and 5 machines with No. 14 taper hole, use 463 Collet.

†Furnished with only one bearing collar.

‡Arbor No. 1111 includes special bushings for arbor supports.

Always Order Arbors by the Code Name and Catalog Number



ARBORS FOR NATIONAL STANDARD SHELL END MILLS

For Milling Machines Having B. & S. Taper Hole in Spindle



Catalog Number	Code Name	Diameter Range of End Mills	Catalog Number	Code Name
10B-1/2	SEHAF (a)	1 1/4"-1 1/2"	12B-1/2	SENOG (a)
10B-3/4	SEREE (a)	1 3/4"-2"	12B-3/4	SEPPE (a)
10B1	SEFIX (a)	2 1/4"-2 1/2"-2 3/4"	12B1	SEXET (a)
10B1 1/4	SEWOL (b)	3"-3 1/2"	12B1 1/4	SEABO (b)
10B1 1/2	SEMFO (c)	4"-4 1/2"-5"	12B1 1/2	SECCA (c)
10B2	SEUKU (d)	5 1/2"-6"	12B2	SEDSI (d)
11B-1/2	SEBBE (a)	1 1/4"-1 1/2"	14B-1/2	SEEHA (a)
11B-3/4	SEDLY (a)	1 3/4"-2"	14B-3/4	SEGFI (a)
11B1	SEGRA (a)	2 1/4"-2 1/2"-2 3/4"	14B1	SEJON (a)
11B1 1/4	SEISK (b)	3"-3 1/2"	14B1 1/4	SEMGA (b)
11B1 1/2	SEKMO (c)	4"-4 1/2"-5"	14B1 1/2	SEPZU (c)
11B2	SELTY (d)	5 1/2"-6"	14B2	SEQUO (d)

(a) Includes screw driver head. (d) Wrench No. 3707 (g) No. 12 B. & S. Taper Shank.
 (b) Wrench No. 3705. (e) No. 10 B. & S. Taper Shank. (h) No. 14 B. & S. Taper Shank.
 (c) Wrench No. 3706. (f) No. 11 B. & S. Taper Shank.

*Arbors with No. 10 B. & S. taper shank are driven by the friction of the taper and have no driving flange.

ARBORS FOR OLD STYLE SHELL END MILLS

For Milling Machines with B. & S. Taper Hole in Spindle



STYLE FL

STYLE PL

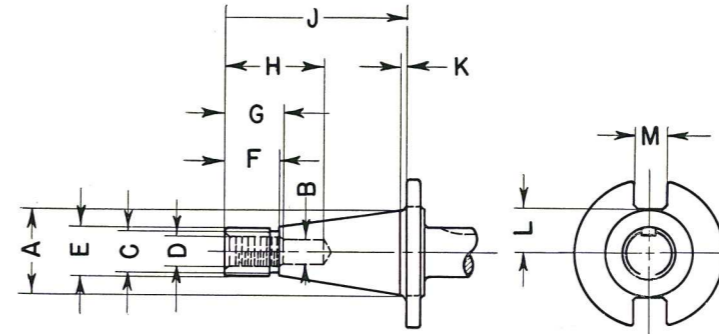
Catalog Number	Style	No. of B. & S. Taper	END FOR CUTTER		Diameter Range of End Mills	Code Name
			Diameter	Length		
301	PL	9	3/4	7/8	1 5/8, 1 3/4, 1 7/8	CACO
302	PL	9	1	1	2, 2 1/4	CADUC
303	PL	10	3/4	7/8	1 5/8, 1 3/4, 1 7/8	CUJOL
304	PL	10	1	1	2, 2 1/4	CALDO
305	PL	10	1 1/4	1 1/4	2 1/2, 2 3/4, 3	CANUS
306	PL	10	1 1/2	1 1/2	3 1/2, 4, 4 1/2, 5, 6	CAPIL
307	PL	11	3/4	7/8	1 5/8, 1 3/4, 1 7/8	CARAF
308	PL	11	1	1	2, 2 1/4	CASCA
309	PL	11	1 1/4	1 1/4	2 1/2, 2 3/4, 3	CATEG
310	PL	11	1 1/2	1 1/2	3 1/2, 4, 4 1/2, 5, 6	CAUDO
313	FL	11	1 1/4	1 1/4	2 1/2, 2 3/4, 3	CERAM
314	FL	11	1 1/2	1 1/2	3 1/2, 4, 4 1/2, 5, 6	CHEVA
317	FL	12	1 1/4	1 1/4	2 1/2, 2 3/4, 3	CIBOR
318	FL	12	1 1/2	1 1/2	3 1/2, 4, 4 1/2, 5, 6	CONVO
319	FL	14	1 1/4	1 1/4	2 1/2, 2 3/4, 3	ARBEM
320	FL	14	1 1/2	1 1/2	3 1/2, 4, 4 1/2, 5, 6	ARELL

Always Order Arbors by the Code Name and Catalog Number



DIMENSIONAL DRAWINGS

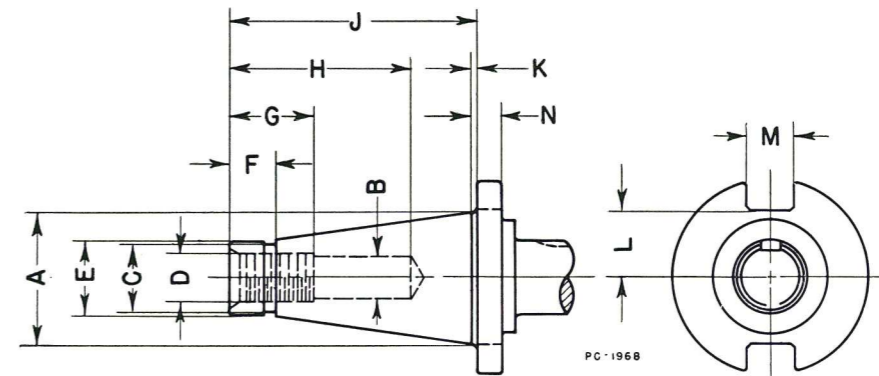
Nos. 40 AND 50 SERIES TAPER SHANK
 For Use on All Milling Machines Except 36" Horizontal Hydro-Tel



Spindle Series	A	B	C	D	E	F
No. 40	1 3/4"	1 1/2"	1 1/8"	5/8"-11	.985"	1"
No. 50	2 3/4"	1 7/8"	1 1/2"	1"-8	1.547"	1"

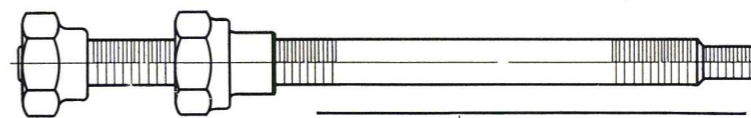
Spindle Series	G	H	J	K	L	M
No. 40	1 1/8"	1 1/8"	3/4"	1/8"	.875"	.630"
No. 50	1 3/4"	3 1/2"	5 1/8"	1/8"	1.375"	1.008"
					1.390"	1.018"

Nos. 50 AND 60 SERIES TAPER SHANK
 For Use on 36" Horizontal Hydro-Tel Only



Spindle Series	A	B	C	D	E	F	G	H	J	K	L	M	N
No. 50	2 3/4"	1 7/8"	1 1/2"	1"-8	1.547"	1"	1 3/4"	3 1/2"	5 1/8"	1/8"	1.375"	1.008"	.600"
					1.549"						1.390"	1.018"	.605"
No. 60	4 1/4"	1 7/4"	2 3/2"	1 1/4"-7	2.359"	1 3/4"	2 1/4"	4 1/4"	8 1/8"	1/8"	2.390"	1.008"	.875"
					2.361"						2.400"	1.018"	.880"

DRAW-IN BOLTS



Arbor draw-in bolts are supplied with double-threaded ends.

When ordering draw-in bolts, always specify machine serial number.

Taper	Thread Dimensions	
	Large Diam.	Small Diam.
No. 50	1"-8	5/8"-11
No. 60	1 1/4"-7	1"-8

Always Order Arbors by the Code Name and Catalog Number



HOW TO STORE, HANDLE, AND USE ARBORS

The ability of a milling machine to produce accurate work in quantity or toolroom lots is dependent upon the arbor and related accessories. If the arbor is improperly stored, mis-handled, or carelessly used, both the quantity and quality of the work produced will be adversely affected. Arbors are precision tools and should be treated with much the same care as given to micrometers, vernier gages, etc. The following paragraphs deal with the proper storage, handling, and usage of arbors.

Storage. When the arbors are not in use, they should be stored in or near the milling department. There are three good methods of storing arbors in order to prevent damage or injury to them: (1) hanging vertically in a rack; (2) placed horizontally on V-supports in cabinet drawers or (3) placed vertically in a rack with the tapered end down.

The first method requires a wooden rack built to accommodate several arbors. The rack should be substantially built, strong enough to support its entire complement of arbors. Also, it should be securely anchored in place so there is no danger of the rack falling and thereby damaging the arbors. With an arbor hanging vertically and supported by its flange, even the heaviest can be easily removed by inserting an eye-bolt in the draw-in bolt hole, attaching a crane, and lifting out the arbor.

Arbor storage may also be accomplished by means of large cabinets with pull-out drawers. The drawers are of varying depths and two arbors are assigned to each drawer according to length, diameter, taper, etc. The drawer itself is so arranged as to support the arbors not only at each end of their usable length but also at the taper and flange. Each drawer should be marked with the catalog numbers of the arbors. By using this drawer arrangement, the arbors are completely protected from grit and dirt, and the possibility of injury is decreased.

Another good way to store arbors is to build a rack in which the arbor rests on its tapered end and slightly leans toward the rear. The back of the rack should support the arbor along its full length. Side rests should also be provided to prevent the arbor from falling sideways. If desired, drawers can be provided in the bottom for storing arbor collars and other accessories.

Whichever method is used, there are a few general precautions to observe when storing the arbors:

1. Wipe the arbor and its keyway clean before storing it. Then apply a light film of oil to prevent rust.
2. If the arbor collars are kept on the arbor, wipe them clean, apply oil, and assemble.

3. Gang mills on arbors should be kept in horizontal racks. Make sure supports are provided adjacent to the cutters to prevent warping.
4. Make sure the arbor is properly supported.
5. Get someone to help you lift heavy arbors to prevent injury to yourself and the arbor.

Extra arbor collars . . . back, spacing, bearing, front . . . should be stored in suitable boxes clearly marked with their name, size, etc. After the collars are used, they should be cleaned and oiled before putting them away.

Handling. Proper handling plays an important part in the long life and accuracy of the arbor. If the arbor is mishandled . . . dropped on the floor or machine table, nicked up, keyways spread apart, etc. . . it will not perform like the precision tool which it is.

General precautions which should be observed when handling arbors are as follows:

1. Always place arbors and accessories on surfaces which will not injure them. If they must be placed on metal, protect the arbor with rags, leather, wood blocks, etc. The ideal method is to use a hardwood board fitted on each side with a V-strip to prevent the arbor from rolling.
2. If the arbor is extremely heavy, get someone to help you lift it. You may seriously injure yourself by trying to lift too heavy an arbor. Before lifting an arbor fitted with collars, tighten the arbor nut by hand to prevent pinching your fingers between sliding collars.
3. When removing an arbor from storage be careful not to let it fall. You may nick or spring it. If the arbor is dropped, or if any mishap occurs, be sure to check the arbor for run-out before using.
4. Always place a charge-out slip for the arbor you are using. Make sure you return your arbor to its proper space. When several arbors of the same size are on hand, it is a good idea to number them 1, 2, 3, etc., so that certain ones can be used for roughing while others can be used for finishing only.
5. When handling gang mills on arbors be careful of the cutters as they are sharp. If you must handle them, protect your hands with thick rags.



HOW TO STORE, HANDLE, AND USE ARBORS (Concluded)

Usage. Proper usage has a leading role in determining the accuracy and productive capacity of the arbor. It must be remembered that the arbor is a precision tool and must be treated as such. To illustrate the correct procedure for proper usage, let's follow an arbor from the time it is received at the machine until the job is set up and running.

When the arbor is received at the machine, it may or may not be fitted with arbor collars. If it is, remove them. Then wipe the arbor and keyway clean. Be sure to protect the arbor when setting it on a metal surface.

Next, select the proper size square driving key and carefully fit it into the arbor keyway. The driving key should not fit extremely tight in the keyway because of the danger of raising burrs or damaging the keyway. For safety's sake, always drive the cutter with a key . . . never depend upon the side pressure of the arbor collars. When fitting the key, be careful not to start it crooked or you will damage the keyway thereby preventing the collars or cutters from fitting properly. File off any burrs on the key or arbor before fitting the collars.

The next step is to thoroughly clean the arbor's taper shank, flange, and the tapered hole in the spindle. These must be absolutely clean and free of even lint particles, as the smallest object will cock the arbor thereby producing inaccurate work. Then insert the tapered shank into the spindle hole, carefully fitting the spindle drive keys in the arbor key-slots. If possible have someone insert the draw-in bolt from the rear and screw it in two or three turns. Then screw it in the rest of the way and lock with the lock nut provided. It is a good idea to check the arbor for concentricity with an indicator by slowly rotating the machine spindle.

Carefully clean each individual back and spacing collar and assemble them on the arbor. The back collar (see page 8) is placed adjacent to the arbor flange to prevent arbor warpage or run-out. Make sure the faces of each collar are particularly clean, as even the smallest particle will cock the collar and consequently spring the arbor when the arbor nut is drawn up tight. Of course, the cutters are also placed on the arbor. They should be mounted as close to the spindle as operating conditions will permit.

When using the Style "B" arbors, clean the bearing collar and assemble it on the arbor. Apply a light film of oil over its entire surface. Always drive the bearing collar with a key.

The next step, for both arbor styles, is to assemble the front collar and arbor nut on the end of the arbor. A front collar (see page 8) must be placed on the arbor before assembling the arbor nut.

Never tighten the arbor nut directly against a bearing or spacing collar as pick-up between the collar and nut will result. Tighten the arbor nut *slightly* with your hands. At no time should the arbor nut be tightened with a wrench until the arbor support is mounted over the arbor collar or pilot end.

Then mount the arbor support on the overarm and tighten its clamping nuts. Start the spindle revolving slowly and move the arbor support over the bearing collar (Style "B") or pilot end (Style "A"), as the case may be, by means of the overarm pilot wheel. Securely tighten the overarm clamping nuts and the arbor clamping nut.

A few general precautions to observe while the machine is in operation are as follows:

1. Don't rapid traverse into the cutter. You will spring the arbor and possibly break the cutter.
2. Lubricate the bearing collar thoroughly by filling the oil reservoir in each arbor support. With proper lubrication, the possibility of the bearing collar freezing and thereby twisting the arbor is eliminated.
3. Keep all parts of your body away from rotating cutters. Don't even brush chips away with a brush while the cutter is running. The coolant nozzle should be positioned so as to wash away the chips. A rotating cutter can grab the brush and severely injure your hand before you have time to jerk it away.
4. Make sure the work is properly clamped. If the work is loosely held it will raise up and probably spring or otherwise damage the arbor.
5. Make sure all projecting parts of the fixture and work will clear the arbor, arbor support, column, etc. To check for interference, hand feed the table, fixture, and work past the stationary cutter. It should be remembered that if the projection just passes underneath the arbor, that the distance from the arbor to the work piece must be decreased by an amount equal to the depth of cut.

After the job has been completed, remove the arbor from the machine. To avoid springing, loosen the arbor nut *before* removing the arbor support. It should be carefully cleaned, the driving key removed, and then the arbor and collars should be oiled.

If gang mills are used and the cutters are not dull when the job is finished, it is a good idea not to loosen the arbor nut in order to retain the proper setting for the next running.

If the preceding recommendations for storage, handling, and usage are followed, your arbors will have a long life span and your milling machine's accuracy and productive ability will be increased.