TECHNICAL DATA

Thread Rolling Attachments & Thread Rolls

Reed
Machinery, Inc.

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THREAD ROLLING MACHINES AND ATTACHMENTS FROM REED®

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Reed Machinery's New Facility

Reed Machinery, Inc. became the new owner of the famous Reed thread rolling machine and attachment product lines in December, 2003 and relocated the operations back to their original home, Worcester, Massachusetts, in a modern facility formerly owned by Heald Machine.

The company is privately owned, with many employees having some share of ownership.

Technical expertise covers the range of machines and attachments used for thread and form rolling so you can be sure that you will get an objective recommendation about what type of process is best suited for your manufacturing situation.

Call, fax or email your thread rolling requirements to Reed Machinery, Inc. for a rapid, accurate response.

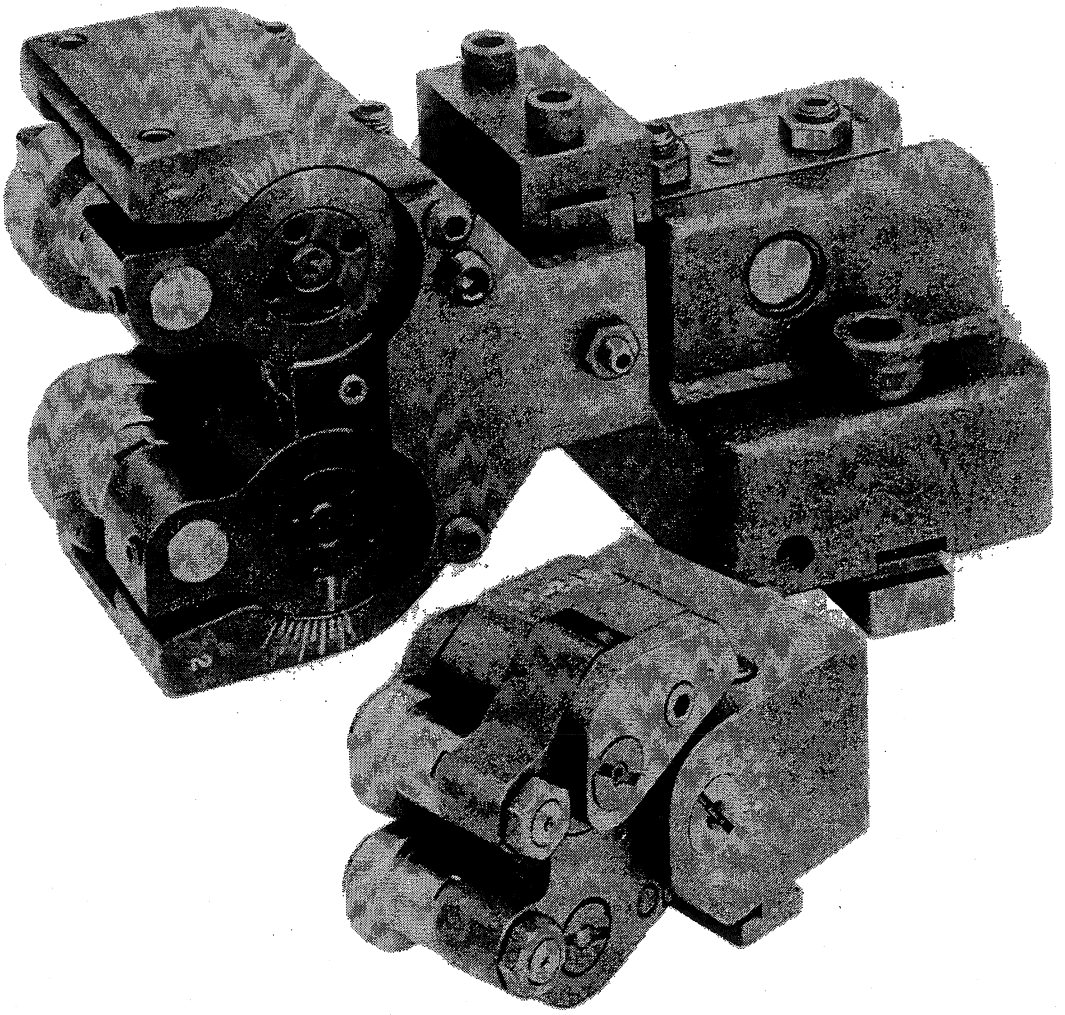
Contents

For Quick Reference

REED THREAD ROLLING ATTACHMENTS — SERIES B

Reed Thread Rolling Attachments are currently built in six standard sizes, and designed to operate from the cross slides of automatic screw machines. Attachments consist of two units . . . a head and an adapter. Six standard heads make possible the selection of an attachment that will provide the maximum thread rolling capacity within the tooling sectors of more than 100 sizes of single and multiple spindle automatic screw machines.

Adapters are of solid or adjustable type and are designed for selected cross-slide positions on the automatics. A large assortment of adapters is available for more than 300 cross-slide applications. By using standard adapters, one head unit may be applied to various thread rolling positions on different sizes and models of machines.



The Reed Series B Thread Rolling Attachments are floating straddle type, two-roll attachments. The two opposed rolls pass over the work at a constant feed rate for a recommended number of work revolutions to form the thread.

Reed Attachments consist of two units — a Head and an Adapter. The Heads are held in the adapters by a dovetail clamping arrangement. The alignment compensator provides free rocking of the Head in the Adapter as shown in Fig. 1. This assures automatic positioning of the rolls in line with the center line of the spindle.

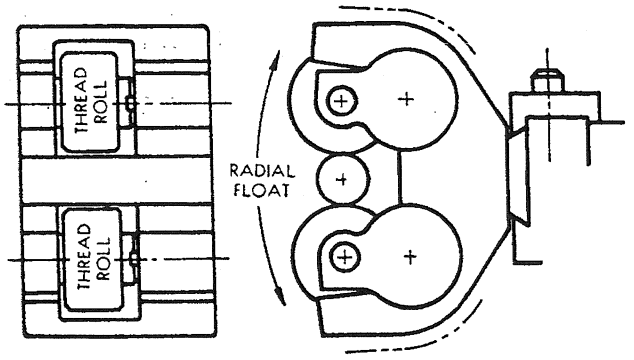


FIG. 1

Each size Reed Attachment is designed with independent adjustable arms to accommodate an infinite range of work diameters within its capacity. The adjustable arms also provide a means for accurate sizing of the work. A simple device for precision matching insures correct alignment of the rolls with the thread throughout the entire rolling cycle. The advance compensator allows rolls of the same diameter to be used, and also allows either roll to contact the work blank first.

APPLICATION PROCEDURE

Since the Reed Series B attachments are designed to permit a wide range of machine and cross-slide installations, as well as a variety of work applications, the following sequence of procedure will be found helpful to both manufacturing, processing and operating departments.

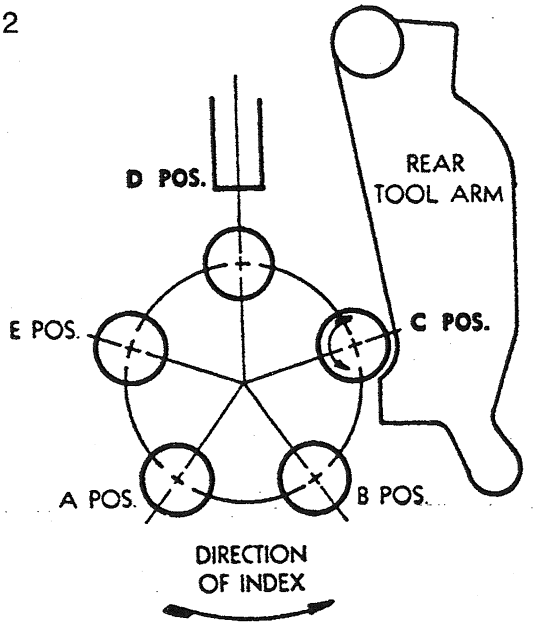
1. Check preferred position on the machine for rolling.
2. Select proper size attachment.
3. Determine required work revolutions and feeds.
4. Consider elements of cam design.

Check Preferred Rolling Position

Preferred rolling positions vary with different makes and models of machines. The following automatic spindle layouts, Figures 2 through 14, designate the cross-slide positions on the different makes of machines which are generally considered the preferred positions for thread rolling. The final selection of the thread rolling position depends on the requirements of the application and the arrangement of the tooling.

Davenport — FIG. 2

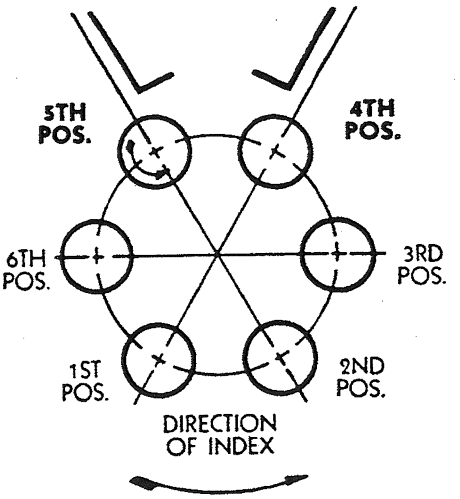
FIG. 2



5 SPINDLE MACHINE

C and D positions preferred for thread rolling

FIG. 4

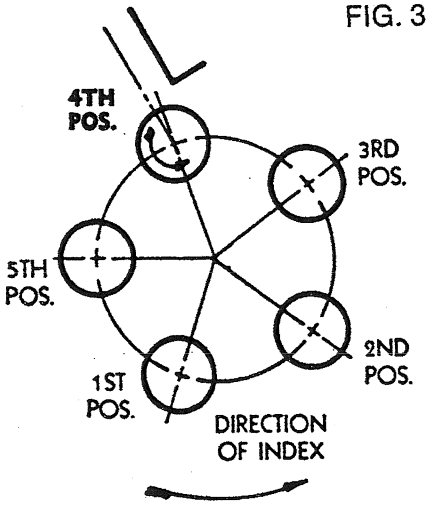


6 SPINDLE MACHINE

4th and 5th positions preferred for thread rolling

Warner & Swasey — FIGS. 3 and 4

FIG. 3

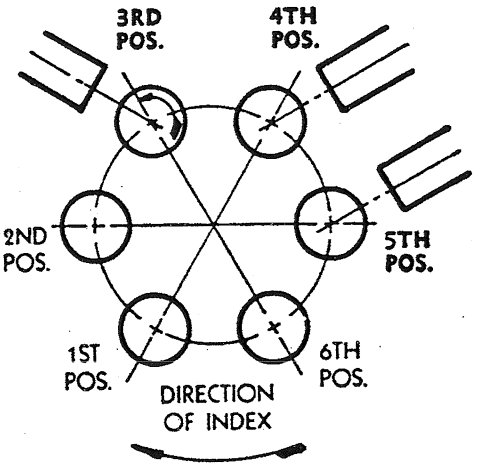


5 SPINDLE MACHINE

4th position preferred for thread rolling

Greenlee — FIG. 5

FIG. 5

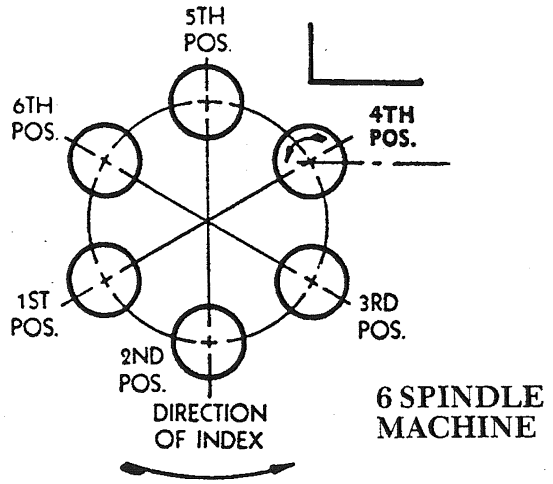


6 SPINDLE MACHINE

3rd, 4th and 5th positions preferred for thread rolling

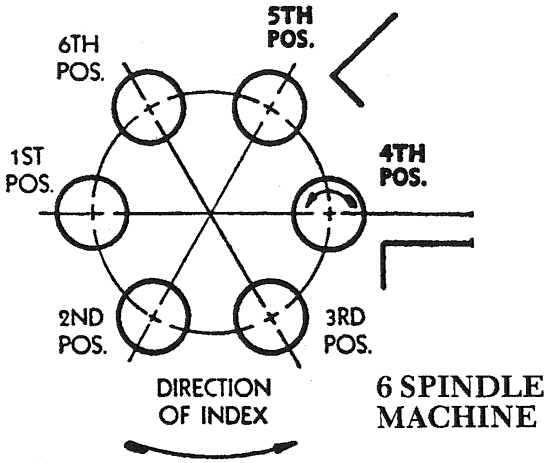
New Britain— FIGS. 6 thru 8

FIG. 6



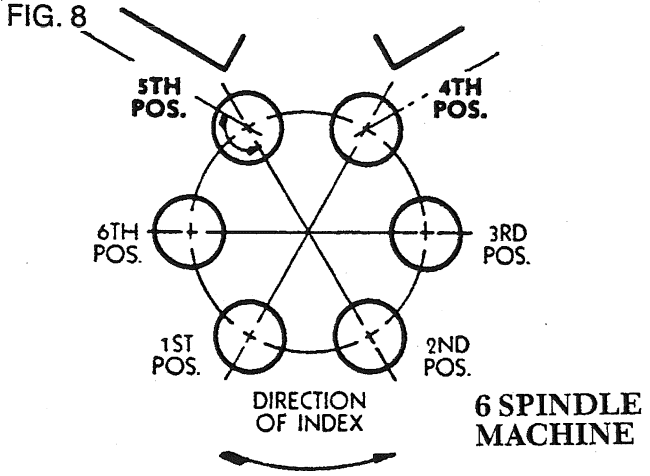
Models 60, 61. 4th positions preferred for thread rolling

FIG. 7



Models 601, 602. 4th and 5th positions preferred for thread rolling

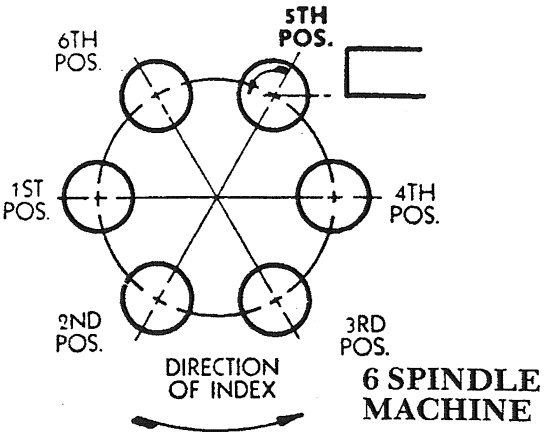
FIG. 8



Models 51, 52, 62. 4th and 5th positions preferred for thread rolling

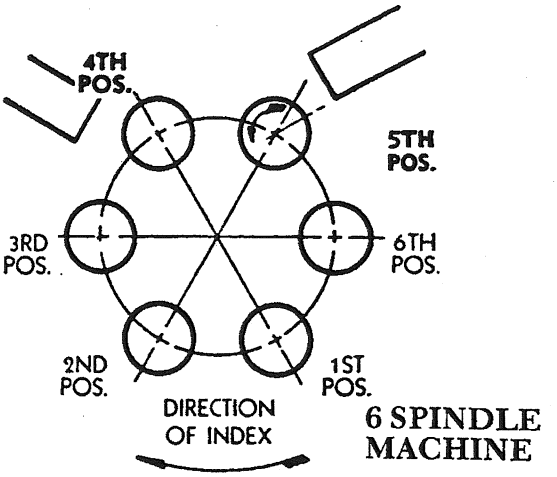
Cone — FIGS. 9 thru 12

FIG. 9



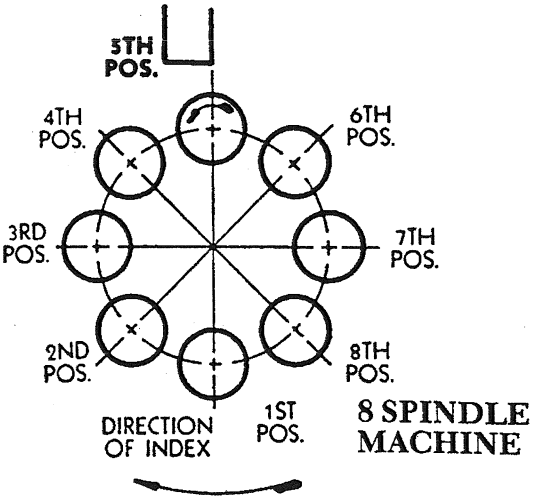
5th position preferred for thread rolling

FIG. 10



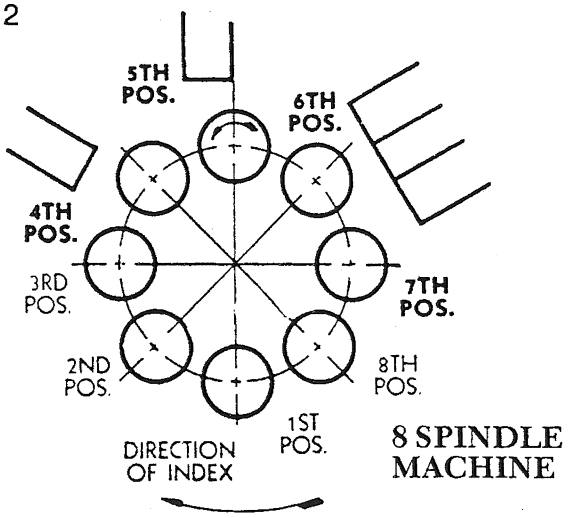
(with Adjustable camming) 4th and 5th positions preferred for thread rolling

FIG. 11



5th position preferred for thread rolling

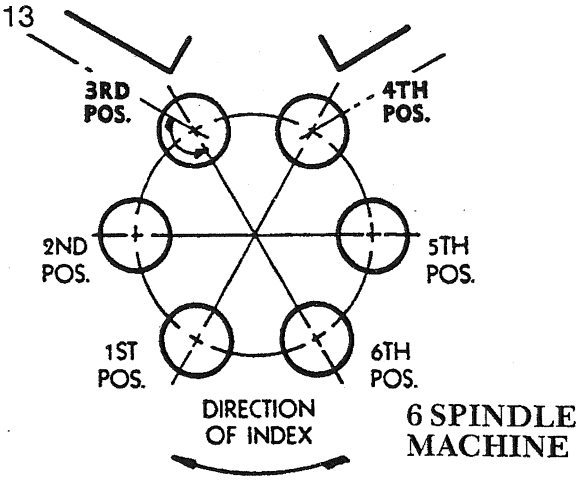
FIG. 12



(with Adjustable camming) 4th, 5th, 6th and 7th positions preferred for thread rolling

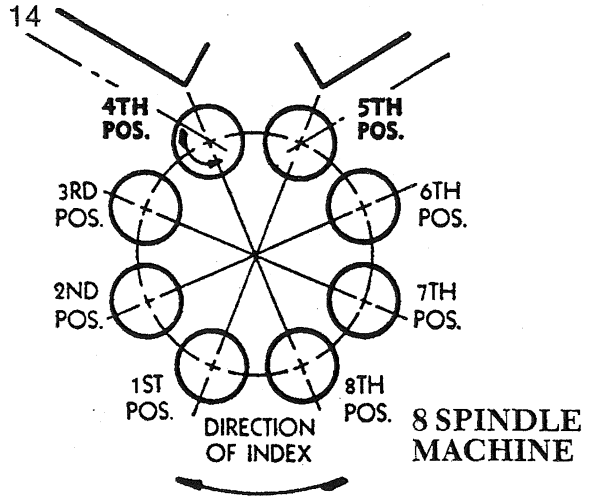
National Acme — (Acme Gridley) — FIGS. 13 and 14

FIG. 13



3rd and 4th positions preferred for thread rolling

FIG. 14



4th and 5th positions preferred for thread rolling

Select Proper Size Attachment

In selecting a Reed Attachment, five major factors are to be considered:

1. The preliminary selection of heads and adapters applicable to the machine.
2. Select heads suitable for the thread diameter and shoulder clearance requirements.
3. Check heads for sufficient thread length rolling capacity for the diameter of thread, and the kind and hardness of material to be rolled.
4. Selection of thread rolls.
5. Final selection of attachment.

Preliminary Selection of Heads

The Reed Attachments are designed to provide maximum threading capacity within the allowable tooling sectors on the machines.

The tooling sector varies with the number of spindles on the machine as shown in Fig. 15. Sufficient cross-slide travel must be provided to withdraw the attachment so the work will clear the rolls during machine indexing.

The sizes of heads that may be used in the tooling sectors of the different cross-slide positions on the various makes and models of machines are shown in the Thread Roll Head and Adapter Selection Charts, Tables 1 through 9. Unless otherwise noted, positive application shown by (X) in the charts indicates the head is within the tooling sector and the standard cross-slide travel is satisfactory.

In some cases it is necessary to consider modifications of the machine in order to use as large a size of head as possible. These conditions are designated by letters in the tables, and are clearly explained in supplementary tables. Included among these conditions are the following:

1. Cross-slide and machine modifications to adapt head.
2. Cam and machine modification to increase cross-slide travel.
3. Consideration of adjacent tooling due to infringement of the head with the adjacent tooling sectors.

It is good practice to consider the largest size head that can be adapted to the machine.

The largest size applicable will provide the greatest range of thread length and diameter capacity for other applications.

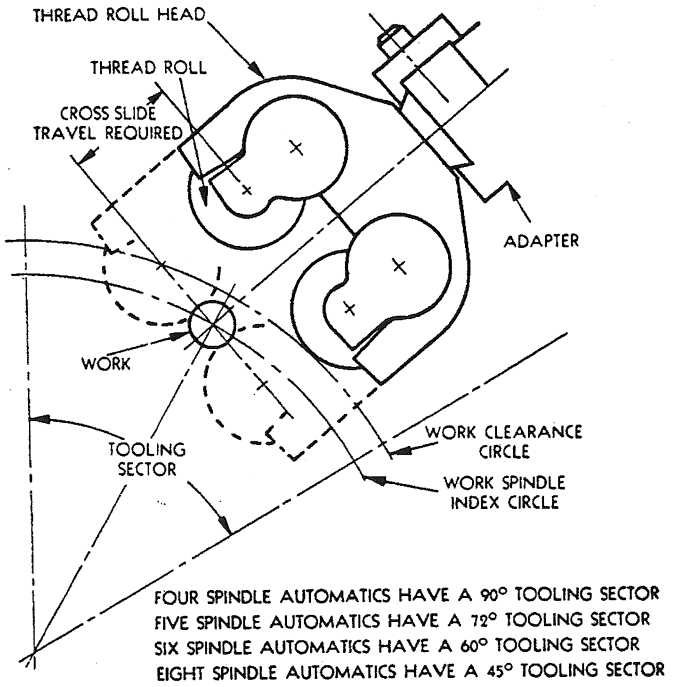


FIG. 15 THE TOOLING SECTOR

Since the Reed Attachments are designed to provide maximum interchangeability on the cross-slide positions of many models and sizes of machines, also consider the size of heads which may be used to the greatest advantage on the various positions of the machines available. This interchangeability is made possible by the proper selection of adapters for the different machine cross-slide positions.

Selection of Adapters

There are two basic designs of adapters available for use with the thread roll head; adjustable type and nonadjustable or solid type.

The adjustable types are used on cross slides having no adjustment or where the adjustment provided is not sufficient for setup purposes. The nonadjustable types are used on cross slides having the required cross-slide adjustments.

These adapters are designated in the Thread Roll Head and Adapters Selection Charts, Tables 1 through 6. In some cases, both types are shown for one position. This indicates that although adjustment is provided in the cross slides, the convenience of adjustment in the adapter may be beneficial for setup purposes.

Select Heads for Thread Diameter and Shoulder Clearance Requirements

At this point, one or more sizes of heads with their respective adapters have been considered. The next step is to determine which of the heads selected will provide the thread diameter and clearance requirements for the application.

Tables 14 and 16 list the thread diameter capacity and shoulder clearance available in each size head for Unified and American Standard External Screw Threads. Shoulder clearance is designated as "B" for each size head. The number of starts on the thread roll, designated as "N," are for reference purposes only. Tables 17 and 18 on page 42 list the same capacity information for External Pipe Threads.

Table 1 — Thread Roll Head and Adapter Selection Chart

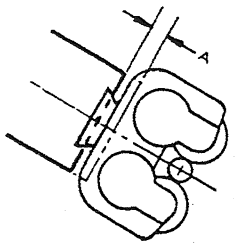
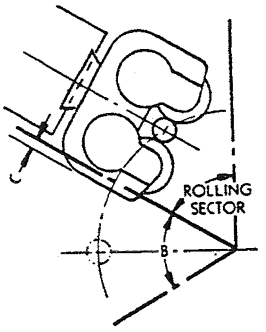
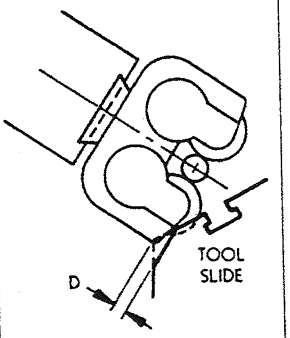
for Greenlee Automatic Screw Machines

Model	Size	Rolling Position	Cross Slide Travel	B10	B13	B18	B36	Type	B10	B13	B18	B36
6 Spindle	1" or 1-1/4"	2	1.750	X	X	—	—	Solid	342	304		
		3	1.750	X	X	(a)	—	Solid	342	304	367	
		4	1.750	X	X	(a)	—	Solid	342	304	367	
		5	1.750	X	X	—	—	Solid	342	304		
6 Spindle	1-5/8" 2" or 2-1/4"	2	2.250	X	X	X*	(b)	Solid	368	369	370	371
		3	2.250	X	X	X*	(c)	Solid	368	369	370	371
		4	2.250	X	X	X*	(d)	Solid	368	369	370	371
		5	2.250	X	X	X*	(e)	Solid	368	369	370	371
6 Spindle	2-5/8" or 3-1/2"	3	2.250	X	X	X	X	Solid	609	610	611	612
		4	3.750	X	X	X	X	Solid	613	614	615	616
		5	3.750	X	X	X	X	Solid	613	614	615	616
		6	2.250	X	X	X	X	Solid	609	610	611	612

(X) Indicates head can be applied without machine modifications. Letters refer to required machine modifications shown in table 1a.
(—) Indicates attachment cannot be applied.

Table 1a — Machine Modifications Required

for Greenlee Automatic Screw Machines according to letters appearing in table 1

Letters Appearing in Table V	Front of Cross Slide	Tooling Sector Infringement		Corner of Tool Slide	Cross Slide Travel	
					*Maximum cross slide travel required to provide work index clearance (see Fig. 15, page 11) for full diameter capacity range of head. Not needed for all thread diameters within the standard diameter capacity. Maximum increase of slide travel possible is 3/16." Refer to factory for exact amount required for specific applications.	
	A	B Sector of Infringement	C Amount of Infringement	D	Standard Travel	*Maximum Travel Required
(a)	3/4			1/2	1.750	2.250
(b)	15/16	3	5/16	1/2	2.250	2.937
(c)	15/16	2	5/16	1/2	2.250	2.937
(d)	15/16	5	5/16	1/2	2.250	2.937
(e)	15/16	4	5/16	1/2	2.250	2.937

* Note: On thread sizes larger than 1" - 10, check for additional cross slide travel required.

Table 2 — Thread Roll Head and Adapter Selection Chart

for Davenport Automatic Screw Machines

Letters refer to required machine modifications shown in table 2a.

(—) Indicates attachment cannot be applied.

	MACHINES			THREAD ROLL HEADS				ADAPTERS				
MODEL	SIZE	ROLLING POSITION	CROSS SLIDE TRAVEL	B10	B13	B18	B36	TYPE	B10	B13	B18	B36
B Regular and B Oversize	9/16" or 5/8"	B	1.250	**	—	—	—	Solid				
		C	ARC 1.250	(a)	—	—	—	Solid	372			
		D	1.250	(b)	—	—	—	Solid	308			

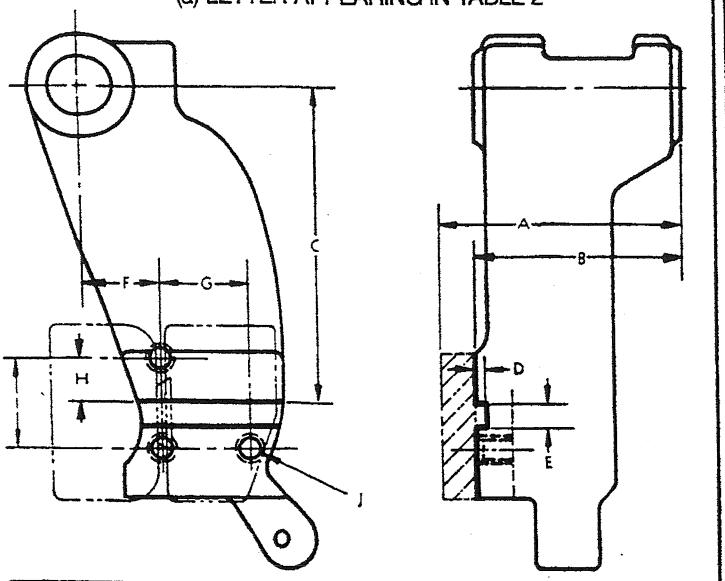
*The adjustment provided in this adapter is for horizontal positioning of the head in relation to the collet face.

**Under certain conditions the B10 size head may be used. Refer to factory for complete information.

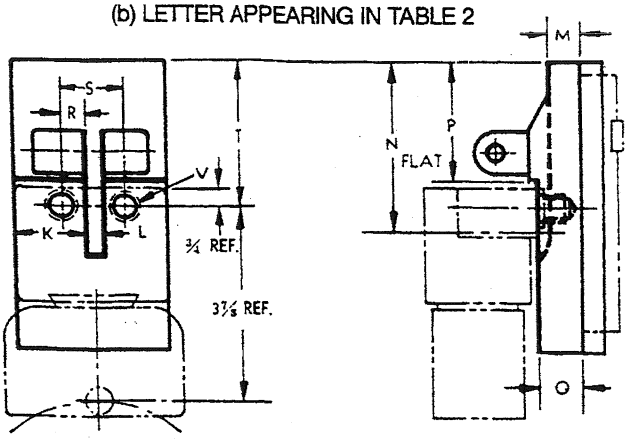
Table 2a — Machine Modifications Required

for Davenport Automatic Screw Machines according to letters noted in table 2.

(a) LETTER APPEARING IN TABLE 2



(b) LETTER APPEARING IN TABLE 2



DIMENSIONS	*STANDARD REAR TOOL ARM (POSITION C)	**SPECIAL REAR TOOL ARM (POSITION C)
A	6-1/8 Ref	
B	5-3/8	
C	6-3/4	
D	.091/.095	
E	.375/.377	
F	1-9/16	1-9/16
G	2	2
H	1	1
I	1-5/8	1-5/8
J	5/16-18 Tap thru 3 Holes	5/16-18 Tap thru 3 Holes

DIMENSIONS	†SPECIAL VERTICAL SLIDE (POSITION D)
K	1-11/32
L	.312/.317
M	9/16
N	3-1/16
O	13/16
P	2-1/8
R	1
S	2-5/16
T	2-7/8
V	3/8-16 Bottom Tap 5/8 Deep-2 Holes

*Usually furnished as standard equipment.

**This special arm, which limits the amount of modification to the addition of 3 tapped holes, is available from the Davenport Machine Co., and is ideally suited for adapting the standard head.

†A special slide, which provides a flat machined surface for adapting the standard head is available from the Davenport Machine Co.

Table 3 — Thread Roll Head and Adapter Selection Chart

for National Acme (Acme-Gridley) Automatic Screw Machines

(×) Indicates head can be applied without machine modifications. (—) Indicates attachment cannot be applied.
Letters refer to required machine modifications shown in table 3a.

Machines				Thread Roll Heads				**Adapters				
Model	Size	Rolling Position	Cross Slide Travel	B10	B13	B18	B36	Type	B10	B13	B18	B36
R-6 and RA-6	5/16"	*2/1	1.750	×	×	—	—	Adj.	*	*		
		3	1.250	×	(a)	—	—	Solid	310	309		
		4	1.250	×	(b)	—	—	Solid	310	309		
		*5/6	1.750	×	×	—	—	Adj.	*	*		
RN-6	5/8"	*2/1	1.000	(bb)	(cc)	—	—	Solid	310	309		
		3	1.500	×	(a)	—	—	Solid	310	309		
		4	1.500	×	(b)	—	—	Solid	310	309		
		*5/6	1.000	(bb)	(cc)	—	—	Solid	310	309		
RA-6 and RAN-6	1"	*2/1	1.750	×	×	(aa)	—	Adj.	*	*	*	
		3	1.250	×	(c)	—	—	Solid	310	309		
		4	1.250	×	(c)	—	—	Solid	310	309		
		*5/6	1.750	×	×	(aa)	—	Adj.	*	*	*	
R-6	1" or 1¼"	*2/1	1.750	×	×	×	—	Adj.	*	*	*	
		3	1.750	×	×	(d)	—	Solid	311	311	312	
		4	1.750	×	×	(d)	—	Solid	311	311	312	
		*5/6	1.750	×	×	×	—	Adj.	*	*	*	
RA-6	1¼"	*2/1	1.750	×	×	×	—	Adj.	*	*	*	
		3	1.750	×	×	(d)	—	Solid	311	311	312	
		4	1.750	×	×	(d)	—	Solid	311	311	312	
		*5/6	1.750	×	×	×	—	Adj.	*	*	*	
RAS-6	1"	*2/1	1.750	×	×	×	—	Adj.	*	*	*	
		3	1.750	×	×	(d)	—	Solid	311	311	312	
		4	1.750	×	×	(d)	—	Solid	311	311	312	
		*5/6	1.750	×	×	×	—	Adj.	*	*	*	
AG-6	1⅜"	2	2.375	×	×	×	—	Adj.	744	745	730	
		3 or 4	2.375	×	×	×	—	Adj.	744	745	730	
RA-6	1⅝"	*2/1	2.500	×	×	×	(aa)	Adj.	*	*	*	*
		3	2.500	×	×	×	(e)	Solid	339	332	314	315
		4	2.500	×	×	×	(f)	Solid	339	332	314	315
		*5/6	2.500	×	×	×	(aa)	Adj.	*	*	*	*
RB-6	1⅝" or 2"	*2/1	2.500	×	×	×	(aa)	Adj.	*	*	*	*
		3	2.500	×	×	×	(e)	Solid	339	332	314	315
		4	2.500	×	×	×	(f)	Solid	339	332	314	315
		*5/6	2.500	×	×	×	(aa)	Adj.	*	*	*	*
RAS-6	2"	*2/1	2.500	×	×	×	(aa)	Adj.	*	*	*	*
		3	2.500	×	×	×	(e)	Solid	339	332	314	315
		4	2.500	×	×	×	(f)	Solid	339	332	314	315
		*5/6	2.500	×	×	×	(aa)	Adj.	*	*	*	*
R-6	1⅝"	*2/1	2.500	×	×	×	(aa)	Adj.	*	*	*	*
		3	2.500	×	×	×	(g)	Solid	339	332	314	315
		4	2.500	×	×	×	(h)	Solid	339	332	314	315
		*5/6	2.500	×	×	×	(aa)	Adj.	*	*	*	*
R-6	2" 2¼" or 2⅝"	*2/1	2.500	×	×	×	(aa)	Adj.	*	*	*	*
		3	2.500	×	×	×	(i)	Solid	343	344	345	346
		4	2.500	×	×	×	(k)	Solid	343	344	345	346
		*5/6	2.500	×	×	×	(aa)	Adj.	*	*	*	*
RA-6 (2¼" ℄) before Serial No. 84806	2" 2¼" or 2⅝"	*2/1	3.500	×	×	×	(aa)	Adj.	*	*	*	*
		3	2.500	×	×	×	(l)	Solid	339	332	314	315
		4	2.500	×	×	×	(m)	Solid	339	332	314	315
		*5/6	3.500	×	×	×	(aa)	Adj.	*	*	*	*

Table 3 — Thread Roll Head and Adapter Selection Chart (Continued)

Machines				Thread Roll Heads				**Adapters				
Model	Size	Rolling Position	Cross Slide Travel	B10	B13	B18	B36	Type	B10	B13	B18	B36
RB-6 (3⅛" ℄) start Serial No. 84806	2⅝"	*2/1	2.500	×	×	×	(aa)	Adj.	*	*	*	*
		3	2.500	×	×	×	(o)	Solid	340	333	335	305
		4	2.500	×	×	×	(p)	Solid	340	333	335	305
		*5/6	2.500	×	×	×	(aa)	Adj.	*	*	*	*
RA-6 and RB-6	3" or 3½"	*2/1	4.500	×	×	×	(aa)	Adj.	*	*	*	*
		3	3.500	×	×	×	×	Solid	340	333	335	305
		4	3.500	×	×	×	×	Solid	340	333	335	305
		*5/6	4.500	×	×	×	(aa)	Adj.	*	*	*	*
RB-6	4"	*2/1	4.500	×	×	×	(aa)	Adj.	*	*	*	*
		3	3.500	×	×	×	×	Solid	340	333	335	413
		4	3.500	×	×	×	×	Solid	340	333	335	413
		*5/6	4.500	×	×	×	(aa)	Adj.	*	*	*	*
RB-6	6"	*2/1	5.000	×	×	×	(aa)	Adj.	*	*	*	*
		3	5.000	×	×	×	×	Solid	410	411	412	391
		4	5.000	×	×	×	×	Solid	410	411	412	391
		*5/6	5.000	×	×	×	(aa)	Adj.	*	*	*	*
RA-8	¾"	*2/1	1.750	×	(aa)	—	—	Adj.	*	*		
		4	1.750	×	(r)	—	—	Solid	408	409		
		5	1.750	×	(s)	—	—	Solid	408	409		
		*7/8	1.750	×	(aa)	—	—	Adj.	*	*		
RB-8 — 1¼" and RBN-8 — 1⅜"		*2/1	2.500	×	×	(aa)	—	Adj.	*	*	*	
		4	2.500	×	×	(t)	—	Solid	311	311	312	
		5	2.500	×	×	(u)	—	Solid	311	311	312	
		*7/8	2.500	×	×	(aa)	—	Adj.	*	*	*	
RA-8 and RB-8	1⅝" or 2"	*2/1	3.500	×	×	(aa)	—	Adj.	*	*	*	
		4	2.500	×	×	×	(v)	Solid	341	334	336	337
		5	2.500	×	×	×	(w)	Solid	341	334	336	337
		*7/8	3.500	×	×	(aa)	—	Adj.	*	*	*	
RA-8 and RB-8	2¼" or 2⅝"	*2/1	4.500	×	×	×	(aa)	Adj.	*	*	*	*
		4	3.500	×	×	×	(y)	Solid	347	348	314	315
		5	3.500	×	×	×	(z)	Solid	347	348	314	315
		*7/8	4.500	×	×	×	(aa)	Adj.	*	*	*	*
RB-8	3½" or 4"	*2/1	5.000	×	×	×	(aa)	Adj.	*	*	*	*
		4	5.000	×	×	×	×	Solid	340	333	335	413
		5	5.000	×	×	×	×	Solid	340	333	335	413
		*7/8	5.000	×	×	×	(aa)	Adj.	*	*	*	*

*Double deck tooling arrangement—first number indicates rolling position; second number indicates position of cross slide used.

When the double deck tooling arrangement is used, it is important to consider the feed rate requirements of the Thread Rolling Attachment and the tooling in the position of the cross slide to be used since both will be controlled by the same cam.

Usually the rate of feed required for thread rolling is higher than for other tooling. A double rise cam is used, providing the proper feed rate for rolling at the end of the working cycle with the first section used for the other tooling on the cross slide.

Since the Thread Rolling Attachment must go to the center line of the work, and operates at the end of the cam cycle, the tooling operating from the cross slide would be limited to shaving, cutting off, or any other operation where the tools can go beyond the center of the work. If no other tooling is operated from the cross slide, the cam would then be used for the thread rolling operation only.

Although not shown in the above chart, the 2nd and 5th positions can be used for rolling in the 6-spindle machines without using the double deck arrangement referred to. Special shelf type side slides as shown in Figure 16 are available from the National Acme Company to replace the standard side slides in those positions. This offers a suitable mounting surface for the attachment and also an independently controlled cam setup to provide the proper rate of feed for rolling.

Note: These special shelf type side slides are also available for the 8-spindle machines replacing the 3rd and 6th positions, standard side slides. This provides two additional positions for rolling on the 8-spindle machines which are not usually considered suitable for this type of application.

The double-deck tooling arrangement must be used when rolling in the 2nd and 7th positions on the 8-spindle machines.

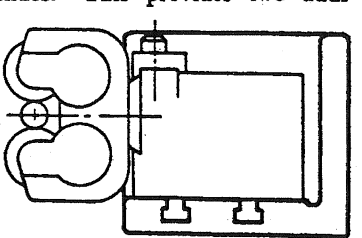
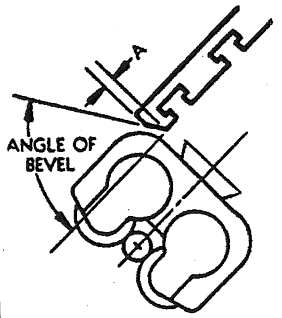
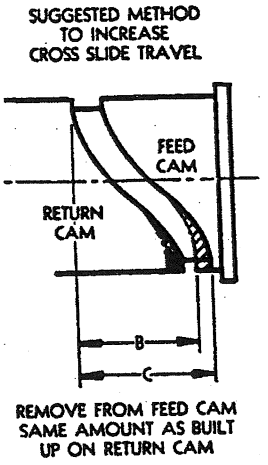
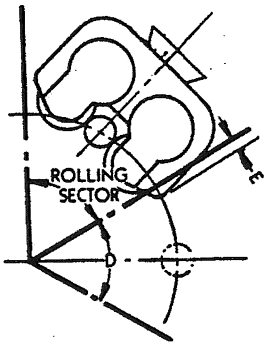
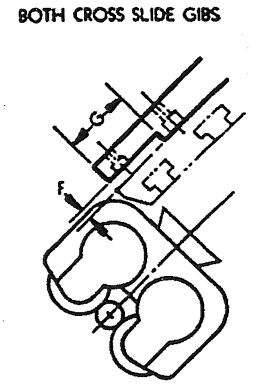


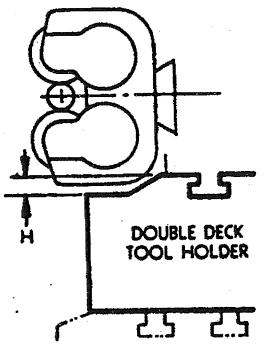
FIG. 16 Special Shelf Type Side Slide

**Special adjustable type adapters can be furnished in place of solid type adapters if desired. The convenience of adjustment in the adapter may be beneficial for setup purposes.

Table 3a — Machine Modifications Required

for National Acme (Acme-Gridley) Automatic Screw Machines according to letters in table 3

Letters Appearing in Table 3	Bevel on Front of Cross Slide	Cross Slide Travel	Tooling Sector Infringement	Cross Slide Gibs
				

	A	Angle of Bevel	B Standard Travel	C Maximum* Travel Required	D Sector of Infringement	E Amount of Infringement	F	G
(a)	5/8	45°			2	1/4		
(b)	5/8	45°			5	1/4		
(c)	5/8	45°	1.250	1.500				
(d)	1/2	45°	1.750	2.000				
(e)	1/2	60°			2	1/2	3/8	2 1/4
(f)	1/2	60°			5	1/2	3/8	2 1/4
(g)	1/2	60°	2.500	2.687	2	3/4	7/16	2 3/4
(h)	1/2	60°	2.500	2.687	5	3/4	7/16	2 3/4
(i)	1/2	60°			2	3/8	3/8	2 1/4
(k)	1/2	60°			5	3/8	3/8	2 1/4
(l)	1/2	60°			2	1/4	3/8	2 1/2
(m)	1/2	60°			5	1/4	3/8	2 1/2
(o)					2	5/16		
(p)					5	5/16		
(r)	5/8	50°			3	3/8		
(s)	5/8	50°			6	3/8		
(t)	1/4	60°			3	1/2	7/16	2 1/2
(u)	1/4	60°			6	1/2	7/16	2 1/2
(v)	3/8	60°	2.500	2.937	3	7/8	3/16	2 1/4
(w)	3/8	60°	2.500	2.937	6	7/8	3/16	2 1/4
(y)	5/8	60°			3	1/2	7/16	2 1/2
(z)	5/8	60°			6	1/2	7/16	2 1/2
(aa)								
(bb)			1.000	1.375				
(cc)			1.000	1.625				

Heads can be adapted with slight modification "H" on top of double deck tool holder.

Since the amount of modification varies with the double deck tool holder used, a complete description of the tool holder must be forwarded to determine the exact amount required.

*Maximum cross slide travel required to provide work index clearance (see Fig. 15, page 11) for full diameter range of head. Not needed for all thread diameters within the standard diameter capacity. Refer to factory for exact amount required for specific applications.

Table 4 — Thread Roll Head and Adapter Selection Chart

for Cone Automatic Screw Machines

(×) Indicates head can be applied without machine modifications.
Letters refer to required machine modifications shown in table 4a, pages 19 and 20.
(—) Indicates attachment cannot be applied.
All BC heads are designed with offset dovetails. All B heads are designed with centralized dovetails.

Machines					Thread Roll Heads				Adapters				
Model		Size	Rolling Position	Cross Slide Travel	B10	BC13	BC18	BC36	Type	B10	BC13	BC18	BC36
6 Spindle (Adjustable Camming)	SL TC or TS	1"	2	1.875	—	—	—	—	Solid				
			3	1.875	×	(a)	—	—	Solid	353	313		
			4	1.875	×	(b)	—	—	Solid	353	313		
			5	1.875	×	(c)	—	—	Solid	353	313		
6 Spindle	TVA TVB	1" or 1¼"	2	3.187	×	×	—	—	Solid	353	313		
			3	3.187	×	×	—	—	Solid	353	313		
			4	3.187	×	×	—	—	Solid	353	313		
			5	3.187	×	×	—	—	Solid	353	313		
6 Spindle (Adjustable Camming)	TF	1⅝"	2	4.000	×	×	(d)	—	Solid	362	352	302	
			3	4.000	×	×	(l)	—	Solid	362	352	302	
			4	4.000	×	×	(m)	—	Solid	362	352	302	
			5	4.000	×	×	(p)	—	Solid	362	352	302	
6 Spindle	SW SX SY TAA TA TG	1" 1¼" 1½" or 1⅝"	2	4.000	×	×	(f)(l)	—	Solid	362	352	302	
			3	4.000	×	×	(g)(1)	—	Solid	362	352	302	
			4	4.000	×	×	—	—	Solid	362	352		
			5	4.000	×	(cc)	(dd)(1)	—	Solid	362	352	302	
6 Spindle	SN	2"	2	3.875	×	×	×	—	Solid	362	352	302	
			3	3.875	×	×	(ee)	—	Solid	362	352	302	
			4	3.875	×	×	×	—	Solid	362	352	302	
			5	3.875	×	×	(ee)*	(ff)*(2)	Solid	362	352	*	*
6 Spindle	SDA SEA	2¼" or 2⅝"	2	4.125	×	×	—	—	Solid	355	356		
			3	4.125	×	×	—	—	Solid	355	356		
			4	4.125	×	×	×	—	Solid	355	356	357	
			5	4.125	×	×	(gg)*	(hh)*	Solid	355	356	*	*
6 Spindle	C6	2⅝"	4	4.000	×	×	×	(nn)	Solid	355	356	357	434
			5	4.000	×	×	×	(nn)	Solid	355	356	357	434
			6	4.000	×	×	×	(oo)	Solid	355	356	357	434
6 Spindle	C6	3½"	3	4.250	×	×	×	×	Solid	358	359	360	548
			4	4.250	×	×	×	×	Solid	358	359	360	548
			5	4.250	×	×	×	×	Solid	358	359	360	548
			6	4.250	×	×	×	×	Solid	358	359	360	548
6 Spindle	SFA SZA	3½" or 4"	2	4.250	×	×	—	—	Solid	358	359		
			3	4.250	×	×	—	—	Solid	358	359		
			4	4.250	×	×	×	×	Solid	358	359	360	548
			5	4.250	×	×	(ii)*	(kk)*	Solid	358	359	*	*
8 Spindle (Divided Slide)	VKA VNA	1" or 1⅝"	2	2.625	×	(j)	—	—	Solid	362	352		
			3	2.625	×	(w)	—	—	Solid	362	352		
			4	2.625	×	(w)	—	—	Solid	362	352		
			5	2.000	×	×	×	—	Adj.	608	433	396	
			6	2.625	×	(ll)	—	—	Solid	362	352		
			7	2.625	×	(mm)	—	—	Solid	362	352		
8 Spindle**	VV WW VB XX	1¼" 1½" 1⅝" or 1⅞"	2	2.625	×	(j)	—	—	Solid	362	352		
			3	2.625	×	(w)	—	—	Solid	362	352		
			4	2.625	×	(w)	—	—	Solid	362	352		
			5	.562	**	**	**	**	Adj	**	**	**	**
			6	2.625	×	(ll)	—	—	Solid	362	352		
			7	2.625	×	(mm)	—	—	Solid	362	352		
8 Spindle (Adjustable Camming)	VE	1⅝"	2	3.000	×	(h)	(i)	—	Solid	362	352	302	
			3	3.000	×	(n)	(t)	—	Solid	362	352	302	
			4	3.000	×	(n)	(u)	—	Solid	362	352	302	
			5	2.218	×	(o)	(v)	—	Solid	362	352	302	
			6	3.000	×	(r)	(aa)	—	Solid	362	352	302	
			7	3.000	×	(s)	(bb)	—	Solid	362	352	302	
8 Spindle (Divided) Slide)	GLA GKA GNA GSA	2¼" 2⅝" 3" or 3¼"	2	4.250	×	×	×	(k)	Solid	603	604	605	606
			3	4.250	×	×	×	(y)	Solid	603	604	605	606
			4	4.250	×	×	×	(y)	Solid	603	604	605	606
			5	2.500	×	×	×	×	Adj.	617	618	559	561
			6	4.250	×	×	×	(e)	Solid	603	604	605	606
			7	4.250	×	×	×	(z)	Solid	603	604	605	606

Table 4 — Thread Roll Head and Adapter Selection Chart (Continued)

for Cone Automatic Screw Machines

Machines					Thread Roll Heads				Adapters				
Model		Size	Rolling Position	Cross Slide Travel	B10	BC13	BC18	BC36	Type	B10	BC13	BC18	BC36
8 Spindle**		2¼" 2⅝" or 3"	2	4.250	X	X	X	(k)	Solid	358	359	360	548
			3	4.250	X	X	X	(y)	Solid	358	359	360	548
			4	4.250	X	X	X	(y)	Solid	358	359	360	548
			5	1.562	**	**	**	**	Adj.	**	**	**	**
			6	4.250	X	X	X	(e)	Solid	358	359	360	548
			7	4.250	X	X	X	(z)	Solid	358	359	360	548
8 Spindle	C8	2⅝"	2	4.000	X	X	X	(tt)	Solid	603	604	605	606
			3	4.000	X	X	X	(rr)	Solid	603	604	605	606
			4	4.000	X	X	X	(rr)	Solid	603	604	605	606
			5	4.000	X	X	(ss)	(pp)	Solid	603	604	605	606
			6	4.000	X	X	X	(rr)	Solid	603	604	605	606
			7	4.000	X	X	X	X	Solid	603	604	605	606

*, **, (1), (2) See top of next page for details.

*The 5th position on these 6-spindle machines is considered the preferred position for rolling. It offers an independently operated position which is desirable for thread rolling since the feed rate for rolling is usually higher than for other operations. The letters with the asterisk refer to machine modification shown in Table 4a on page 19 giving information pertaining to cross-slide travel.

Additional slide travel is necessary for adapting the size attachments shown. Additional travel in the 5th position can be provided by using a special cross slide or by reworking the standard slide with a special set of cross-slide links. These special slides are available as well as information on reworking the standard slide from the Cone Automatic Machine Co.

If machines are equipped with the special slides, the serial number of the machine and information on the slide assembly or part numbers, must be forwarded to the factory to insure correct adapter design.

**These 8-spindle machines listed are for machines equipped with one cross slide at the front machine for positions 2, 3 and 4, and another at the rear of the machine for positions 6, 7 and 8. The 5th position, which can be equipped with a special independently operated cross slide, is considered the preferred position for rolling on these machines. These special slides are available as well as information on the slide design from the Cone Automatic Machine Co.

If machines are equipped with these special slides, the serial number of the machine and information on the slide assembly, or part numbers, must be forwarded to the factory to insure correct adapter design.

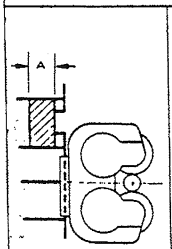
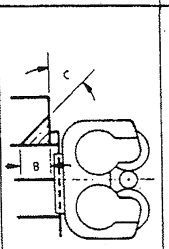
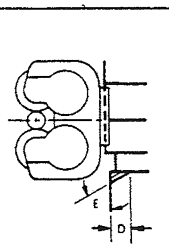
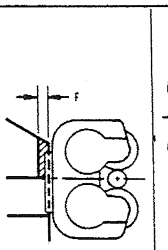
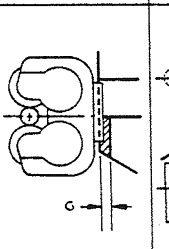
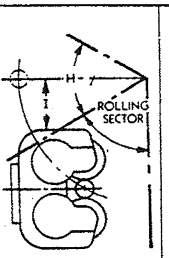
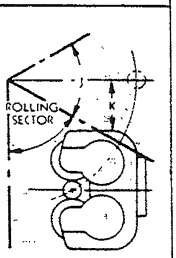
Note: Later models of the 8-spindle machines are equipped with two (divided) slides at the front of the machine and two slides at the rear of the machine. Refer to the factory for proper head and adapter selections for these machines.

(1) ⅛" x 45° Bevel at corner of head body to clear turret tool slide.

(2) ½" Interference of head body with turret tool slide.

Table 4a — Machine Modifications Required

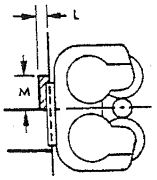
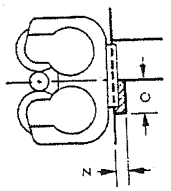
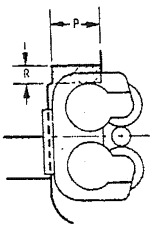
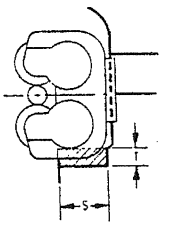
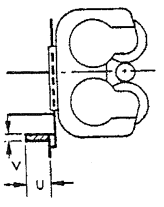
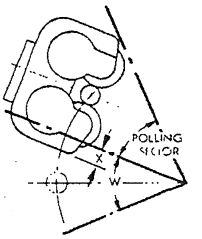
for Cone Automatic Screw Machines according to letters appearing in table 4

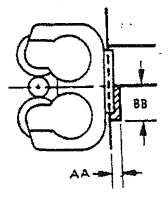
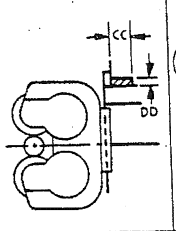
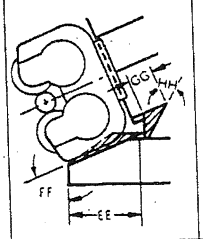
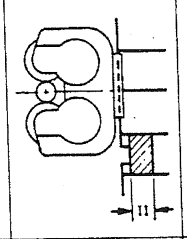
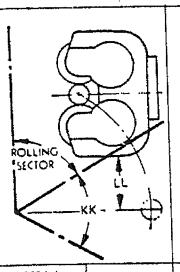
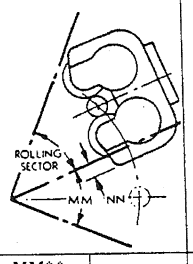
Letters Appearing in Table 4	Cutout on Slides											Tooling Sector Infringement			
	Wear Plates				Slide Frame										
															
	A	Between Slides	B	C	D	E	Position No.	F	Depth of Cut*	G	Depth of Cut*	H** Sector of Infringement	I	J Sector of Infringement	K
(a)	1 3/16	3 and 4													
(b)			1 5/8	45°											
(c)					1/2	60°	6								
(d)								3/8	1 1/8			3	3		
(e)										11/16	3 1/2				
(f)												1	2 1/8		
(g)														4	2 1/8
(h)								1/4	2 3/8			3	3 1/4		
(i)								7/8	2 1/2			3	2 5/16		
(j)								1/4	1			3	2 5/16		
(k)								11/16	3 1/2						
(nn)										1/4	2				
(oo)								1/4	2						

*Depth of cut in cross slide frame as shown.

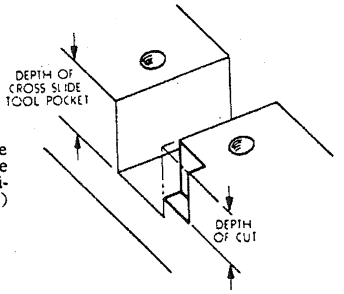
**It is important to consider the tooling to be used in the sector of infringement to avoid any possible interference of that tool with the attachment. The amount of infringement has been specified for that purpose.

Table 4a — Machine Modifications Required (Continued)

Letters Appearing in Table 4	Cutout on Slides — Slide Frame										Wear Plate		Tooling Sector Infringement	
														
	L	M	Depth of Cut*	N	O	Depth of Cut*	P	R	S	T	U	V	W** Sector of Infringement	X
(l)	3/8	1 1/16	1 1/8								2 3/4	1/16		
(m)	3/8	1 1/16	1 1/8											
(n)	1/4	13/16	2 3/8											
(o)	1/4	13/16	2 3/8											
(p)				3/8	1 1/16	1 1/8								
(r)				1/4	13/16	2 3/8								
(s)				1/4	13/16	2 3/8								
(t)	7/8	1 5/8	2 1/2											
(u)	7/8	1 5/8	2 1/2										3	1/4
(v)	7/8	1 5/8	2 1/2											
(w)	1/4	1	1											
(y)	1 1/16	1 1/2	3 1/2				1 5/8	7/16						
(z)				7/8	13/16	3 1/2			1 5/8	7/16				

Letters Appearing in Table 4	Cutout on Slides — Slide Frame			Cutout on Slides — Wear Plate							Tooling Sector Infringement				Cross Slide Travel	
															† Maximum cross slide travel required to provide work index clearance (see Fig. 15, page 11) for full diameter capacity range of head. Not needed for all thread diameters within the standard diameter capacity. Refer to factory for exact amount required for specific applications.	
	AA	BB	Depth of Cut*	CC	DD	EE	FF	GG	HH	II	Between Slides	KK** Sector of Infringement	LL	MM** Sector of Infringement	NN	Standard Travel	†Maximum Travel Required
(aa)	7/8	1 3/16	2 1/2	1 3/8	1/4									7	1/4		
(bb)	7/8	1 3/16	2 1/2			3 3/8	70°	2	55°								
(cc)										1/2	4 and 5						
(dd)										1 3/16	4 and 5	4	2 1/8				
(ee)										1/2††	4 and 5					3.875	4.500
(ff)										2††	4 and 5	4	2 7/16			3.875	5.000
(gg)										3/8††	4 and 5					4.125	4.875
(hh)										2 3/4††	4 and 5	4	3			4.125	5.437
(ii)																4.250	5.875
(kk)																4.250	6.375
(ll)	1/4	1	1									7	3				
(mm)	1/4	1	1														
(nn)	Refer to page 14.																
(oo)	Refer to page 14.																
(pp)	1 1/16	1 1/2	3 1/2													4.000	5.500
(rr)	1 1/16	1 1/2	3 1/2			2 1/8	60°										
(ss)																4.000	5.000
(tt)	1 1/16	1 1/2	3 1/2														

*Depth of cut in cross slide frame as shown.



††The amount of modification shown is based on the maximum cross slide travel required (†). If the actual cross slide travel is more or less than the maximum travel required, the amount of modification (II) would be changed accordingly.

**It is important to consider the tooling to be used in the sector of infringement to avoid any possible interference of that tool with the attachment. The amount of infringement has been specified for that purpose.

Table 5 — Thread Roll Head and Adapter Selection Chart

for New Britain-Gridley Automatic Screw Machines

(×) Indicates head can be applied without machine modifications.
Letters refer to required machine modifications shown in table 5a. (–) Indicates attachment cannot be applied.

Machines				Thread Roll Heads				Adapters				
Model	Size	Rolling Position	Cross Slide Travel	B10	B13	B18	B36	Type	B10	B13	B18	B36
51	1"	3	1.750	×	(u)	—	—	Adj.	318	307		
		4	1.750	×	(v)	—	—	Adj.	318	307		
		5	1.750	×	(w)	—	—	Adj.	318	307		
52	1¼"	3	1.750	×	×	aa	—	Adj.	318	307	693	
		4	2.000	×	×	(m)	—	Adj.	318	307	486	
		5	1.750	×	×	(n)	—	Adj.	318	307	486	
60 Before Serial No. 24472	1"	2	No Slide	—	—	—	—	Adj.				
		3	1.156	(a)	—	—	—	Adj.	316			
		4	1.750	×	(b)	—	—	Adj.	316	317		
		5	Cut-off Slide	—	—	—	—	Adj.				
60 Starting Serial No. 24472	1"	2	No Slide	—	—	—	—	Adj.				
		3	1.156	(a)	—	—	—	Adj.	318			
		4	1.750	×	(c)	—	—	Adj.	318	307		
		5	Cut-off Slide	—	—	—	—	Adj.				
61 Before Serial No. 24341	1⅝" 2" or 2¼"	2	No Slide	—	—	—	—	Adj.				
		3	2.250	×	×	(d)	—	Adj.	419	420	421	
		4	3.500	×	×	(e)	—	Adj.	319	320	321	
		5	Cut-off Slide	×	×	×	—	Adj.	322	323	324	
61 Starting Serial No. 24341	1⅝" 2" or 2¼"	2	No Slide	—	—	—	—	Adj.				
		3	2.250	×	×	(f)	—	Adj.	422	326	424	
		4	3.500	×	×	(g)	(h)	Adj.	329	326	327	328
		*5	Cut-off Slide	×	×	×	—	Adj.	322	323	324	
62	1⅝" or 2¼"	2	2.543	×	×	—	—	Adj.	329	326		
		3	2.312	×	×	(y)	(z)	Adj.	640	641	642	626
		4	2.312	×	×	×	(k)	Adj.	329	326	327	328
		5	2.312	×	×	×	(l)	Adj.	329	326	327	328
601	1" 1"¼ or 1⅜"	2	1.375	×	×	×	—	Adj.	325	330	331	
		3	1.375	×	×	×	—	Adj.	325	330	331	
		4	1.375	×	×	×	—	Adj.	325	330	331	
		**5	1.375	×	×	(i)	—	Adj.	325	330	331	
602	2¼"	2	2.000	×	×	×	—	Adj.	325	330	331	
		3	2.000	×	×	×	—	Adj.	325	330	331	
		4	2.000	×	×	×	—	Adj.	325	330	331	
		5	2.000	×	×	×	—	Adj.	325	330	331	
635	3½"	3	2.500	×	×	×	(p)	Adj.	589	590	591	527
		4	3.500	×	×	×	×	Adj.	592	593	594	595
		5	3.500	×	×	×	×	Adj.	592	593	594	595
826	2⅝"	3	3.500	×	×	(r)	—	Adj.	596	597	598	
		4	2.500	×	×	×	(s)	Adj.	589	590	591	527
		5	3.500	×	×	×	×	Adj.	589	590	591	527
		6	3.500	×	×	×	×	Adj.	589	590	591	527
		7	2.500	×	×	×	(t)	Adj.	589	590	591	527

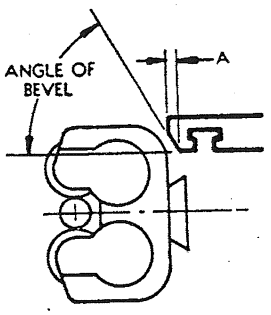
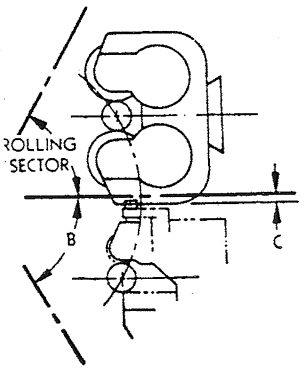
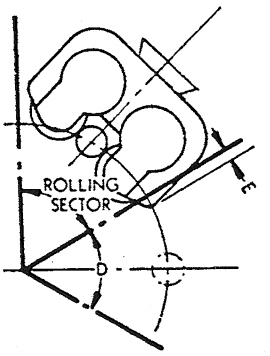
*Check for possible interference with stock stop when attachment is applied in this position and end of work does not extend beyond thread roll head. In the cases of interference, it may be necessary to use an extension on the stock stop.

**Applies on machines equipped with "T-Slot" type slides.

Note: Adapters for models 60 and 61 machines will be furnished for the later serial numbers unless otherwise specified.

Table 5a — Machine Modifications Required

for New Britain-Gridley Automatic Screw Machines
according to letters noted in table 5, page 21

Letters Appearing in Table 5	Bevel on Front of Cross Slide		Tooling Sector Infringement				Cross Slide Travel	
							*Maximum cross slide travel required to provide work index clearance (see Fig. 15, page 11) for full diameter capacity range of head. Not needed for all thread diameters within the standard diameter capacity. Refer to factory for exact amount required for specific applications.	
	A	Angle of Bevel	B** Sector of Infringement	C Amount of Infringement	D** Sector of Infringement	E Amount of Infringement	Standard Travel	*Maximum Travel Required
(a)							1.156	1.306
(b)	1¼	30°	3	¼				
(c)	⅞	45°	3	¼				
(d)	1¾	40°	4	1/16			2.250	2.312
(e)	1¾	40°	3	1/16				
(f)			4	1/16			2.250	2.312
(g)			3	1/16				
(h)	½	45°	3	15/16				
(i)					4	9/16	1.375	1.750
(k)	⅜	45°			3	1		
(l)	⅜	45°			6	1		
(m)	⅝	60°			3	⅝	2.000	2.125
(n)	⅝	60°			6	⅝	2" Spec.	2.125
(p)							2.500	2.625
(r)	9/16	60°						
(s)	5/16	60°			3	7/16	2.500	2.875
(t)					8	⅜		
(u)					4	¼		
(v)					3	¼		
(w)					6	¼		
(y)					4	⅛		
(z)	1⅛	45°	2	¼	4	15/16	2.312	2.562
(aa)	⅝	60°			4	9/16	1.750	2.000

**It is important to consider the tooling to be used in the sector of infringement to avoid any possible interference of that tool with the attachment. The amount of infringement has been specified for that purpose.

Table 6 — Thread Roll Head and Adapter Selection Chart

for Warner & Swasey Automatic Screw Machines

(×) indicates head can be applied without machine modifications.
Letters refer to required machine modification shown in table 6a.
(–) Indicates attachment cannot be applied.

Machines				Thread Roll Heads				Adapters				
Model	Size	Rolling Position	Cross Slide Travel	B10	B13	B18	B36	Type	B10	B13	B18	B36
5 Spindle	1¾" or 2¼"	2	1.937	×	×	(a)	–	Adj.	377	378	375	
		3	1.937	×	×	(a)	–	Adj.	373	378	375	
		4	2.000	×	×	(a)	–	Adj.	377	378	375	
6 Spindle	¾" or 1¼"	2	2.000	×	–	–	–	Adj.	377			
		3	1.500	–	–	–	–	Adj.				
		4	1.625	×	×	(a)	–	Adj.	373	378	375	
		5	1.625	×	×	(a)	–	Adj.	377	378	375	

Table 6a — Machine Modifications Required

for Warner & Swasey Automatic Screw Machines according to letters appearing in table 6

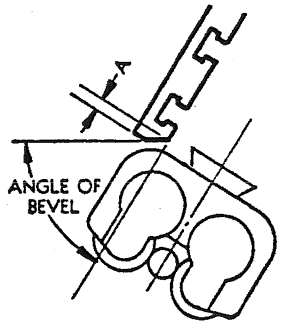
Letter Appearing in Table 6	Bevel on Front of Cross Slide	
		
	A	Angle of Bevel
(a)	1 1/16	45°

Table 7 — Thread Roll Head and Adapter Selection Chart
For Wickman Automatic Screw Machines

(×) Indicates head can be applied without machine modifications.
Letters refer to required machine modification shown in table 8.
(–) Indicates attachment cannot be applied.

Machines				Thread Roll Heads					Adapters					
Model	Size	Roll Pos.	Slide Travel	B8	B10	B13	B18	B36	Type	B8	B10	B13	B18	B36
12A	2	Rear		X	X	X	GG	—	Solid				497	
4	3½	3	3.750	X	X	X	X	X	Solid	701	702	703	704	305
	4⅛	4	3.750	X	X	X	X	X	Solid	701	702	703	704	305
5	1⅜	1	2.000	KK	E	F	—	—	Solid			509		
		2	1.562	X	X	X	D-Y	—	Solid	705	706	509		
		3	1.687	X	X	X	—	—	Solid	705	706	509		
		4	1.875	X	X	X	—	—	Solid	705	706	509		
5	1¾	1	2.062	—	—	—	—	—	Solid					
	2¼	2	2.062	X	X	X	LL	—	Solid	773	775	777	779	
		3	1.875	X	X	X	MM	—	Solid	774	776	778	780	
		4	1.875	X	X	X	X	—	Solid	773	775	777	779	
6	⅝	1	1.250	EE	FF	—	—	—	Solid	619	708	709		
		2	1.250	EE	FF	—	—	—	Solid	619	708	709		
		4	1.250	X	X	G	—	—	Solid	619	708	709		
		5	1.250	X	X	G	—	—	Solid	619	708	709		
6	1"	1	1.250	A	A	C	—	—	Solid	710	560	517		
		2	1.500	W	W	DD	—	—	Solid	710	560	517		
		4	1.500	X	X	X	—	—	Solid	523	560	517		
		5	1.250	X	X	X	—	—	Solid	523	560	517		
6	1⅜	1	2.562	X	P	N	O	—	Solid	712	713	665	575	
	1¾	2	2.562	X	P	N	O	—	Solid	712	713	665	575	
		4	2.313	X	X	X	W	—	Solid	712	713	665	575	
		5	2.313	X	X	X	W	—	Solid	712	713	665	575	
6	2¼	1	2.750	T	T	U	V-HH	—	Solid	714	715	716	630	
		2	2.937	R	R	S	V-JJ	—	Solid	714	715	716	630	
		4	2.625	X	X	X	X	BB	Solid	714	715	716	630	583
		5	2.625	X	X	X	X	BB	Solid	714	715	716	630	583
6	2⅝	1	3.750	M	M	L	K	—	Solid	717	718	719	720	
	3¼	2	3.812	M	M	I	H	—	Solid	717	718	719	720	
		4	3.750	X	X	X	X	XAA	Solid	717	718	719	720	305
		5	3.750	X	X	X	X	XAA	Solid	717	718	719	720	305

Table 8 — Machine Modifications Required

For Wickman Automatic Screw Machines according to letters in table 7

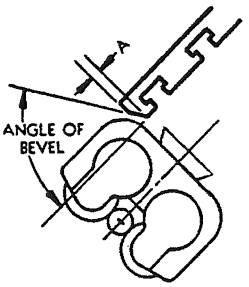
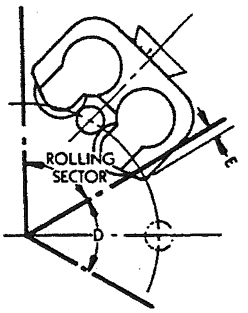
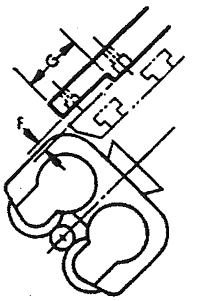
Letters Appearing in Table 7	Bevel on Front of Cross Slide		Cross Slide Travel		Tooling Sector Infringement		Cross Slide	
			† Maximum cross slide travel required to provide work index clearance (see Fig. 15, page 11) for full diameter capacity range of head. Not needed for all thread diameters within the standard diameter capacity. Refer to factory for exact amount required for specific applications.				BOTH CROSS SLIDE GIBS 	
	A	Angle of Bevel	Standard Travel	†Maximum Travel Required	D Sector of Infringement	E Amount of Infringement	F	G
A			1.250	2.250	2.000			
B	¾	35°						
C	1 5/16	25°	1.250	2.250				
D	⅝	30°						
E			2.000	2.875				
F			2.000	3.125				
G	9/16	40°			4 & 5	⅜		
H			3.812	5.562				
I			3.812	5.062				
K			3.750	5.625				
L			3.750	5.625				
M			3.750	4.750				
O			2.562	3.437				
P			2.562	2.812				
R			2.937	3.500				
S			2.937	3.687				
T			2.750	3.375				
U			2.750	3.937				
V					End Working Slide			
W					3 & 6	½		
Y					2	¼		
Z								
AA					3 & 6	¼		
BB	1¼	45°			3 & 6	⅝		
CC								
DD			1.500	2.250				
EE			1.250	1.375				
FF			1.250	1.594			⅜	11/16
GG	1¼	30°						
HH			2.750	3.937				
JJ			2.937	4.000				
KK			2.000	2.813				
LL			2.062	2.187				
MM			1.875	2.250				

Table 9 — Thread Roll Head and Adapter Selection Chart

(X) Indicates head can be applied without machine modifications or attachment alterations when the vertical slide is or is not used.

(*) Indicates head can be applied without machine modifications or attachment alterations when the vertical slide is not used.

Figure numbers refer to illustrations showing conditions of machine modifications, attachment alteration and consideration of application requirements necessary when the vertical slide is or is not used.

(—) Indicates attachment cannot be applied.

MACHINES				THREAD ROLL HEADS				ADAPTERS			
Model	Cross Slide	Cross Slide Travel	Direction of Spindle Rotation	B10	B13	B18	B36	B10	B13	B18	B36
00G	Front	1.000	Either Direction	—	—	—	—				
	Rear	1.000	Either Direction	—	—	—	—				
0G	Front	1.250	Counter-clockwise	*	—	—	—				
	Front	1.250	Clockwise	Fig. 17	—	—	—	380			
	Rear	1.250	Counter-clockwise	Fig. 18	—	—	—	380			
	Rear	1.250	Clockwise	*	—	—	—				
2G	Front	1.750	Counter-clockwise	Fig. 19	—	—	—	381			
	Front	1.750	Clockwise	Fig. 20	Fig. 23	—	—	381	389		
	Rear	1.750	Counter-clockwise	Fig. 21	Fig. 24	—	—	381	389		
	Rear	1.750	Clockwise	Fig. 22	Fig. 25	—	—	381	389		
4**	Front	2.500	Either Direction	X	Fig. 26	Fig. 27	—	428	306	429	
	Rear	2.500	Either Direction	X	Fig. 26	Fig. 27	—	428	306	429	

**Applies to machines after Serial No. 296 having 2½" cross slide travel. Refer to factory for application on Model No. 4 machines before Serial No. 297 having less than 2½" cross slide travel.

Fig. 17 — B10 Attachment on No. OG Brown & Sharpe

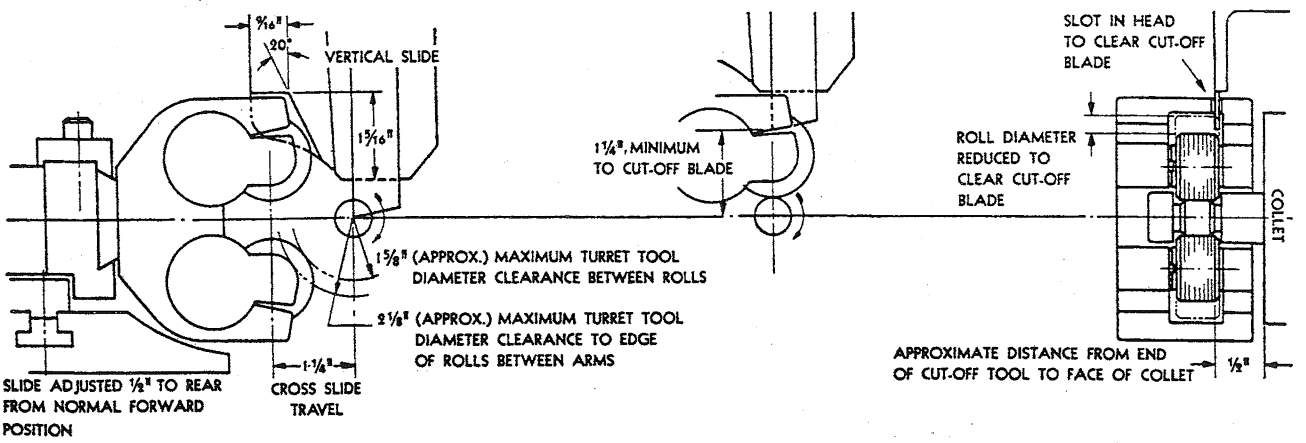
Front cross slide — clockwise spindle rotation

The conditions of interference shown apply only when the vertical slide is used. The amount of interference shown is the maximum possible.

When the attachment is in the retracted position and the vertical slide is in the down position with the cutoff blade at the center of the work, there is interference of the slide with the attachment as shown in View 1a. This interference can be eliminated by altering the vertical slide as shown.

When the attachment is in the forward position and the vertical slide is in the up position with the cutoff blade 1¼" from the center line of the work, there is interference of the attachment with the cutoff blade as shown in View 1b.

This interference can be eliminated by providing a slot in the head as shown in View 1c. The position of this slot is determined by the location of the thread to be rolled in relation to the cutoff end of the work. The width of the



View 1a View 1b View 1c

slot is determined by the width of the cutoff blade used.

In some cases, with the attachment in the forward position and the vertical slide in the up position, there is interference of the roll with the cutoff blade. This occurs when the work is cut off directly at the end of the thread, and the diameter of the roll plus ½ the minor diameter of the thread on the work is greater than the distance of the cutoff blade from the center line of the work. The approximate diameter of the roll is equal to the pitch diameter of the thread times the number of starts on the roll.

If this interference occurs, under certain conditions it can be eliminated by using a smaller diameter roll with fewer starts than would normally be furnished, as shown in View 1c. When it is necessary to use a smaller diameter roll, the shoulder clearance given in the Thread Roll Capacity table on pages 41 and 42 would be less.

When the work has a hole extending into the cutoff section, the amount of interferences shown would be reduced in an amount approximately equal to ½ the diameter of the hole since the vertical slide and cutoff blade would not usually be advanced to the center line of the work.

Fig. 18 — B10 Attachment on No. OG Brown & Sharpe

Rear cross slide — counterclockwise spindle rotation

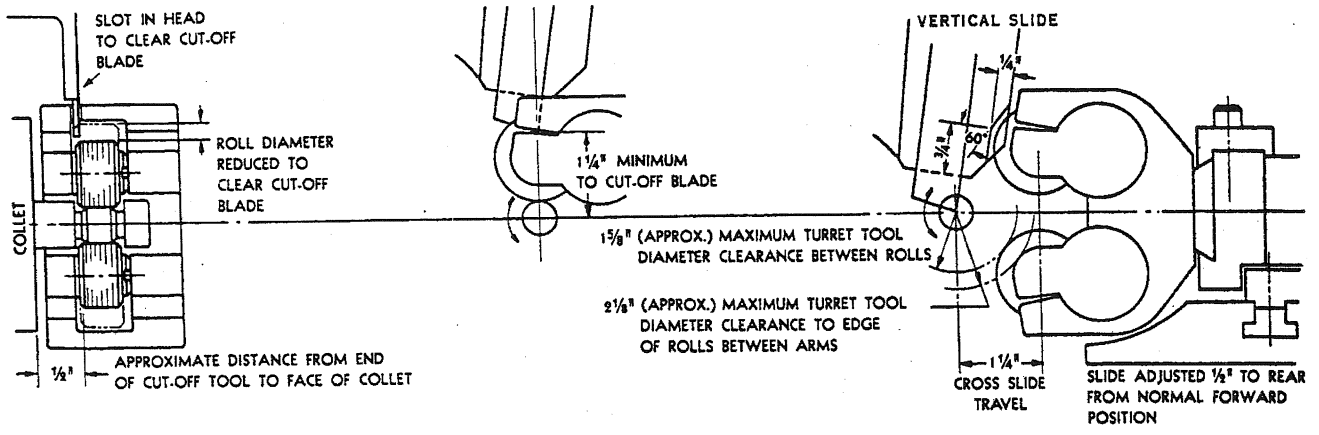
The conditions of interference shown apply only when the vertical slide is used. The amount of interference shown is the maximum possible.

When the attachment is in the retracted position and the vertical slide is in the down position with the cutoff blade at the center of the work, there is interference of the slide with the attachment as shown in View 2c. This interference can be eliminated by altering the vertical slide as shown.

When the attachment is in the forward position and the vertical slide is in the up position and the cutoff blade 1¼" from the center line of the work, there is interference of the attachment with the cutoff blade as shown in View 2b.

This interference can be eliminated by providing a slot in the head as shown in View 2a. The position of this slot is determined by the location of the thread to be rolled in relation to the cutoff end of the work. The width of the slot is determined by the width of the cutoff blade used.

In some cases, with the attachment in the forward position and the vertical slide in the up position, there is interference of the roll with the cutoff blade. This occurs when the work is cut off directly at the end of the thread, and the diameter of the roll plus ½ the minor diameter of the thread on the work is greater than the distance of the cutoff blade from the center line of the work. The approximate diameter of the roll is equal to the pitch diameter of the thread times the number of starts on the roll.



View 2a View 2b View 2c

If this interference occurs, under certain conditions it can be eliminated by using a smaller diameter roll with fewer starts than would normally be furnished, as shown in View 2a. When it is necessary to use a smaller diameter roll, the shoulder clearance given in the Thread Roll Head Capacity tables on pages 41 and 42 would be less.

When the work has a hole extending into the cutoff section, the amount of interferences shown would be reduced in an amount approximately equal to ½ the diameter of the hole since the vertical slide and cutoff blade would not usually be advanced to the center line of the work.

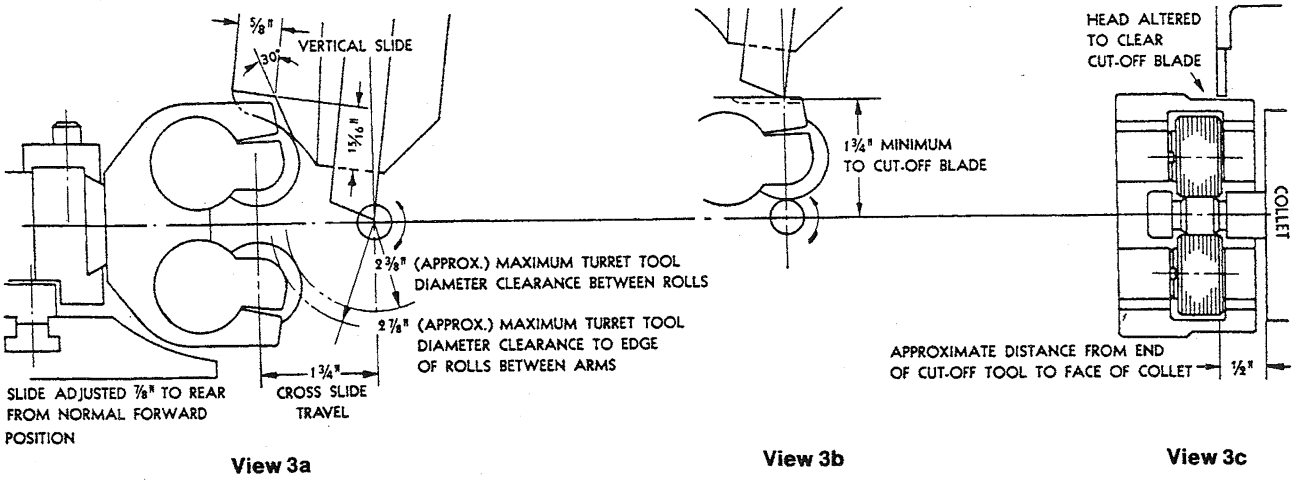
Fig. 19 — B10 Attachment on No. 2G Brown & Sharpe

Front cross slide — counterclockwise spindle rotation

The conditions of interference shown apply only when the vertical slide is used. The amount of interference shown is the maximum possible.

When the attachment is in the retracted position and the vertical slide is in the down position with the cutoff blade at the center of the work, there is interference of the slide with the attachment as shown in View 3a. This interference can be eliminated by altering the vertical slide as shown.

When the work has a hole extending into the cutoff section, the amount of interferences shown would be reduced in an amount approximately equal to ½ the diameter of the hole since the vertical slide and cutoff blade would not usually be advanced to the center line of the work.



View 3a View 3b View 3c

Fig. 20 — B10 Attachment on No. 2G Brown & Sharpe

Front cross slide — clockwise spindle rotation

The conditions of interference shown apply only when the vertical slide is used. The amount of interference shown is the maximum possible.

When the attachment is in the retracted position and the vertical slide is in the down position with the cutoff blade at the center of the work, there is interference of the slide with the attachment as shown in View 4a. This interference can be eliminated by altering the vertical slide as shown.

When the work has a hole extending into the cutoff section, the amount of interferences shown would be reduced in an amount approximately equal to ½ the diameter of the hole since the vertical slide and cutoff blade would not usually be advanced to the center line of the work.

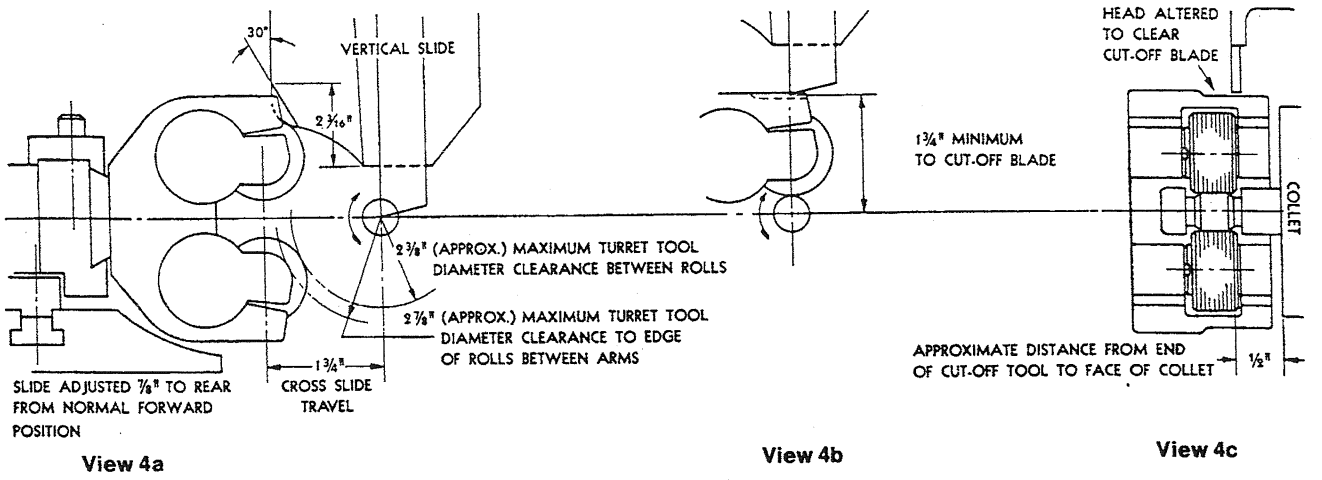


Fig. 21 — B10 Attachment on No. 2G Brown & Sharpe

Rear cross slide — counterclockwise spindle rotation

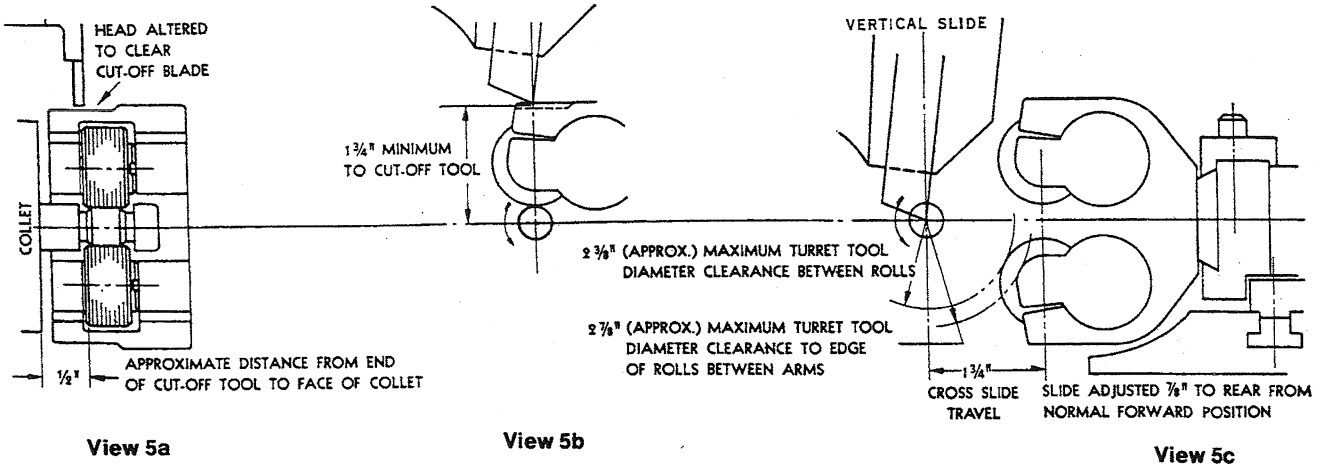


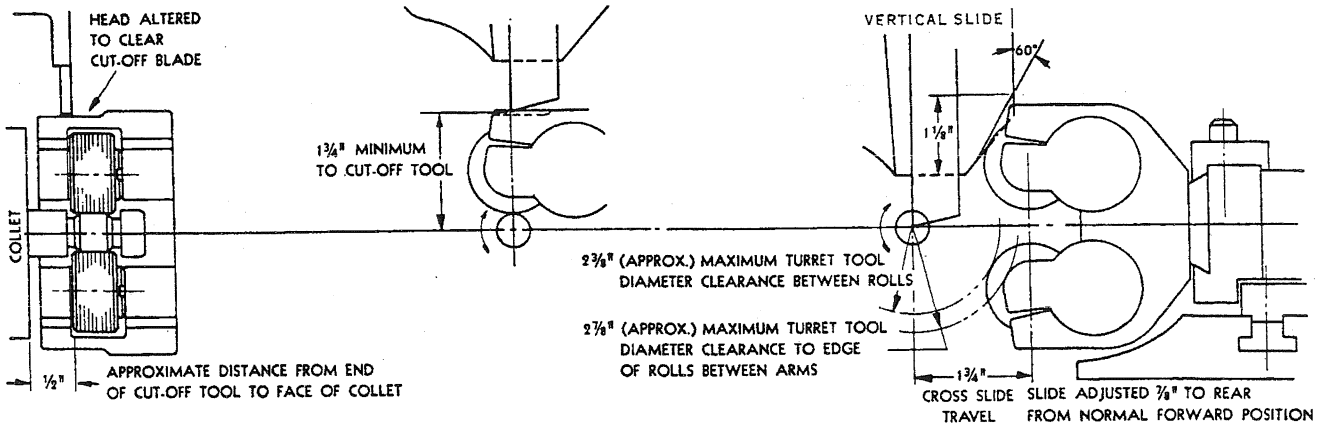
Fig. 22 — B10 Attachment on No. 2G Brown & Sharpe

Rear cross slide — clockwise spindle rotation

The conditions of interference shown apply only when the vertical slide is used. The amount of interference shown is the maximum possible.

When the attachment is in the retracted position and the vertical slide is in the down position with the cutoff blade at the center of the work, there is interference of the slide with the attachment as shown in View 6c. This interference can be eliminated by altering the vertical slide as shown.

When the work has a hole extending into the cutoff section, the amount of interferences shown would be reduced in an amount approximately equal to ½ the diameter of the hole since the vertical slide and cutoff blade would not usually be advanced to the center line of the work.



View 6a View 6b View 6c

Fig. 23 — B13 Attachment on No. 2G Brown & Sharpe

Front cross slide — clockwise spindle rotation

The conditions of interference shown apply only when the vertical slide is used. The amount of interference shown is the maximum possible.

When the attachment is in the retracted position and the vertical slide is in the down position with the cutoff blade at the center of the work, there is interference of the slide with the attachment as shown in View 7a. This interference can be eliminated by altering the vertical slide as shown.

When the attachment is in the forward position and the vertical slide is in the up position with the cutoff blade 1¾" from the center line of the work, there is interference of the attachment with the cutoff blade as shown in View 7b.

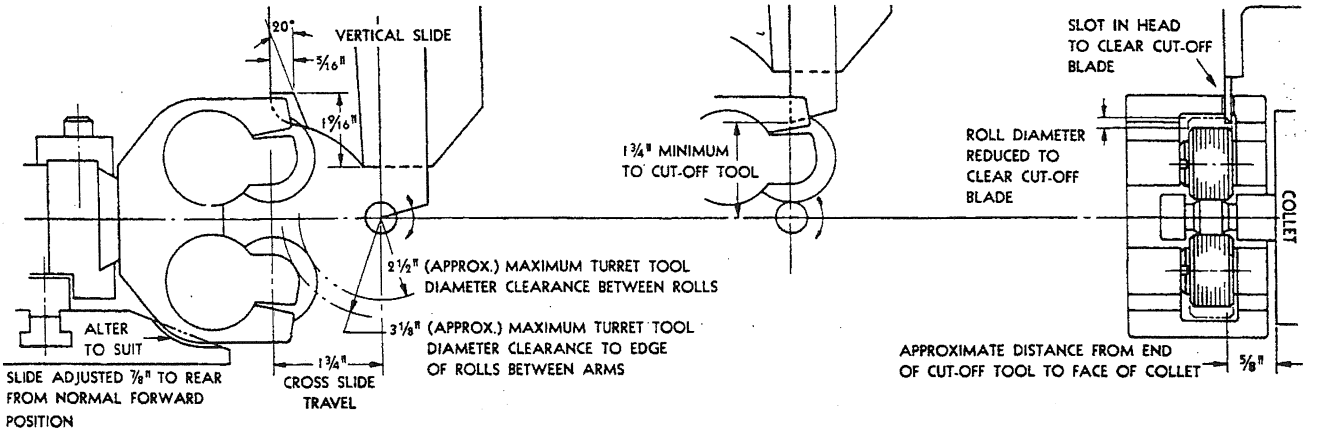
This interference can be eliminated by providing a slot in the head as shown in View 7c. The position of this slot is determined by the location of the thread to be rolled in relation to the cutoff end of the work. The width of the slot is determined by the width of the cutoff blade used.

In some cases, with the attachment in the forward position and the vertical slide in the up position, there is interference of the roll with the cutoff blade. This occurs when the work is cut off directly at the end of the thread, and the diameter of the roll plus ½ the minor diameter of the thread on the work is greater than the distance of the cutoff blade from the center line of the work. The approximate diameter of the roll is equal to the pitch diameter of the thread times the number of starts on the roll.

If this interference occurs, under certain conditions it can be eliminated by using a smaller diameter roll with fewer starts than would normally be furnished, as shown in View 7c. When it is necessary to use a smaller diameter roll, the shoulder clearance given in

the Thread Roll Head Capacity tables on pages 41 and 42 would be less.

When the work has a drilled hole extending into the cutoff section, the amount of interferences shown would be reduced in an amount approximately equal to ½ the diameter of the hole since the vertical slide and cutoff blade would not usually be advanced to the center line of the work.



View 7a View 7b View 7c

Fig. 24 — B13 Attachment on No. 2G Brown & Sharpe

Rear cross slide — counterclockwise spindle rotation

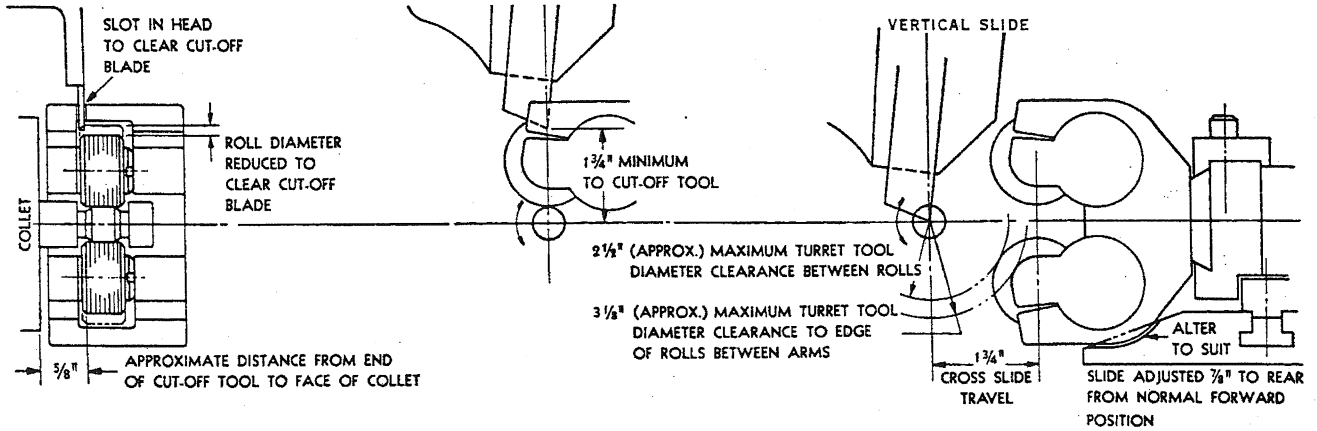
The conditions of interference shown apply only when the vertical slide is used. The amount of interference shown is the maximum possible.

When the attachment is in the retracted position and the vertical slide is in the down position with the cutoff blade at the center of the work, there is interference of the slide with the attachment as shown in View 8c. This interference can be eliminated by altering the vertical slide as shown.

When the attachment is in the forward position and the vertical slide is in the up position with the cutoff blade 1¾" from the center line of the work, there is interference of the attachment with the cutoff blade as shown in View 8b.

This interference can be eliminated by providing a slot in the head as shown in View 8a. The position of this slot is determined by the location of the thread to be rolled in relation to the cutoff end of the work. The width of the slot is determined by the width of the cutoff blade used.

In some cases, with the attachment in the forward position and the vertical slide in the up position, there is interference of the roll with the cutoff blade. This occurs when the work is cut off directly at the end of the thread, and the diameter of the roll plus ½ the minor diameter of the thread on the work is greater than the distance of the cutoff blade from the center line of the work. The approximate diameter of the roll is equal to the pitch



View 8a View 8b View 8c

diameter of the thread times the number of starts on the roll.

If this interference occurs, under certain conditions it can be eliminated by using a smaller diameter roll with fewer starts than would normally be furnished, as shown in View 8a. When it is necessary to use a smaller diameter roll, the shoulder clearance given in the Thread Roll Head Capacity tables on pages 41 and 42 would be less.

When the work has a hole extending into the cutoff section, the amount of interferences shown would be reduced in an amount approximately equal to ½ the diameter of the hole since the vertical slide and cutoff blade would not usually be advanced to the center line of the work.

Fig. 25 — B13 Attachment on No. 2G Brown & Sharpe

Rear cross slide — clockwise spindle rotation

The conditions of interference shown apply only when the vertical slide is used. The amount of interference shown is the maximum possible.

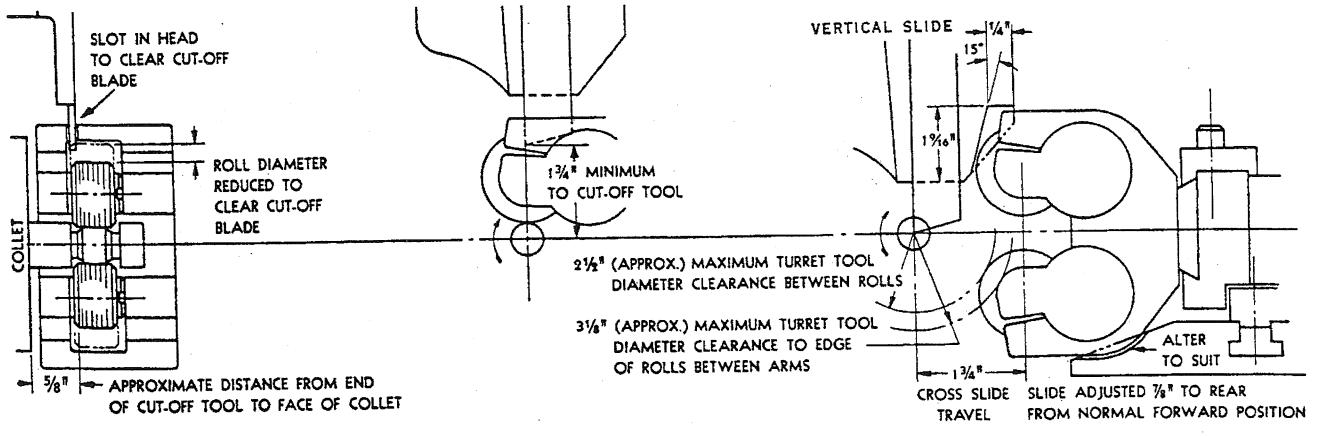
When the attachment is in the retracted position and the vertical slide is in the down position with the cutoff blade at the center of the work, there is interference of the slide with the attachment as shown in View 9c. This interference can be eliminated by altering the vertical slide as shown.

When the attachment is in the forward position and the vertical slide is in the up position with the cutoff blade 1¾" from the center line of the work, there is interference of the attachment with the cutoff blade as shown in View 9b.

This interference can be eliminated by providing a slot in the head as shown in View 9a. The position of this slot is determined by the location of the thread to be rolled in relation to the cutoff end of the work. The width of the slot is determined by the width of the cutoff blade used.

In some cases, with the attachment in the forward position and the vertical slide in the up position, there is interference of the roll with the cutoff blade. This occurs when the work is cut off directly at the end of the thread, and the diameter of the roll plus ½ the minor diameter of the thread on the work is greater than the distance of the cutoff blade from the center line of the work. The approximate diameter of the roll is equal to the pitch diameter of the thread times the number of starts on the roll.

If this interference occurs, under certain conditions it can be eliminated by using a smaller diameter roll with fewer starts than would normally be furnished, as shown in View 9a. When it is necessary to use a smaller diameter roll, the shoulder clearance given in the Thread Roll Head Capacity tables on pages 41 and 42 would be less.



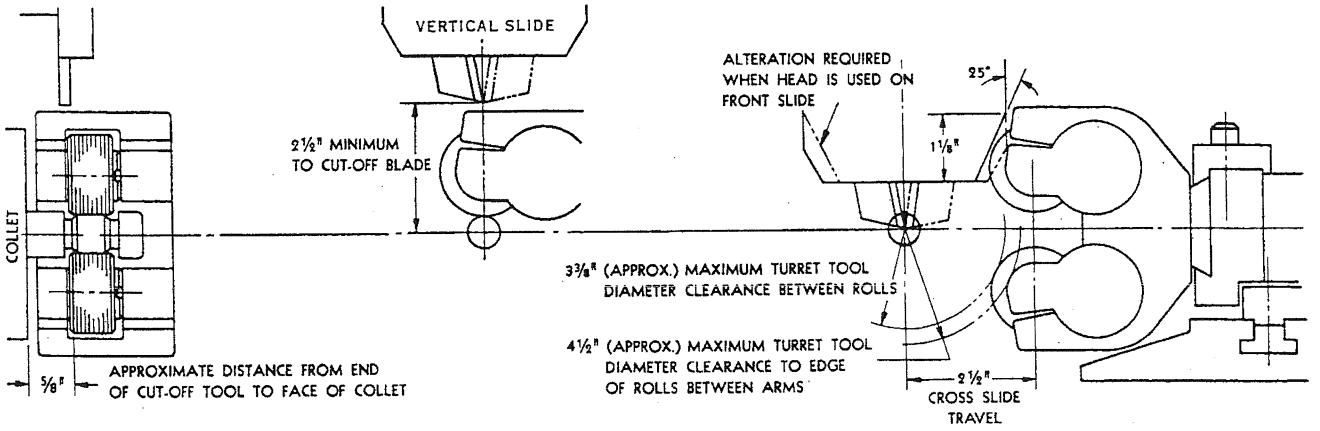
View 9a View 9b View 9c

Fig. 26 — B13 Attachment on No. 4 Brown & Sharpe

Front or rear cross slide — spindle rotation — either direction

The conditions of interference shown apply only when the vertical slide is used. The amount of interference shown is the maximum possible.

When the attachment is in the retracted position and the vertical slide is in the down position with the cutoff blade, there is interference of the slide with the attachment as shown in View 10c. This interference can be eliminated by altering the vertical slide as shown.



View 10a View 10b View 10c

BROWN & SHARPE ULTRAMATICS

Application requirements for Brown & Sharpe Ultramatics vary depending on the machine model.

If the machine is a No. 2 Ultramatic*, a different set of conditions applies (as diagrammed on the following page).

The first factor to determine is whether the machine is equipped with both front and rear upper slides and, if so, whether both slides are needed for the application. If only one upper slide is required, slide modifications may not be necessary. For example, where a front upper slide only is needed and spindle rotation is clockwise, no slide modifications are required (Fig. 28 on following page). On machines with a rear upper slide and clockwise spindle rotation, no modifications are necessary but the slide must be removed or held retracted (Fig. 30).

Other conditions are covered in the accompanying diagrams.

Figure 27 — Rear upper slide, counterclockwise spindle rotation. B-10 head. Slide must be altered as shown to eliminate interference.

Figure 28 — Front upper slide, clockwise spindle rotation. B-10 head. No slide alteration required.

Figure 29 — Front upper slide, counterclockwise spindle rotation. B-10 head. Slide alteration as shown, plus set screws to clear head.

Figure 30 — Rear upper slide, counterclockwise spindle rotation. B-10 or B-13 head. Slide must be removed or held in retracted position.

Figure 31 — Front upper slide, counterclockwise spindle rotation. B-13 head. Slide alteration as shown, plus set screws to clear head. (This application is not recommended due to major modification required.)

Figure 32 — Front upper slide, clockwise spindle rotation. B-13 head. Slight alteration of slide, as shown.

Note: In order to use the B-13 head on the rear slide either for clockwise or counterclockwise spindle rotation, the upper rear slide must be removed, or held in retracted position.

Turret Tool Diameter

Because the cross-slide travel available on the No. 2 Ultramatic is 1⅞" rather than the 1¾" on other Brown & Sharpe machines, maximum turret tool diameter can be increased approximately ¼".

*Modifications for a No. 2 or No. 3 Ultramatic are identical.

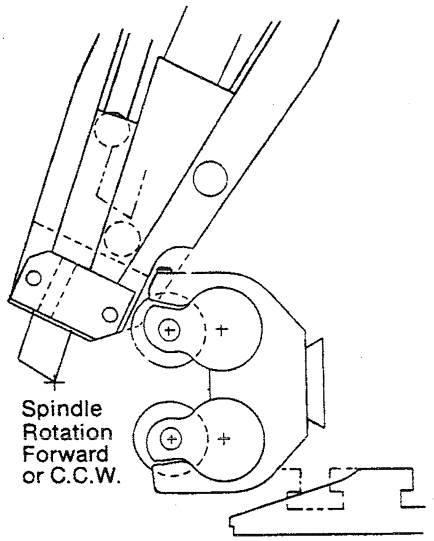


Figure 27 **Rear Slide**
B10 Reed Thread Roll Attachment
— #2 Brown & Sharpe — 4 Slide

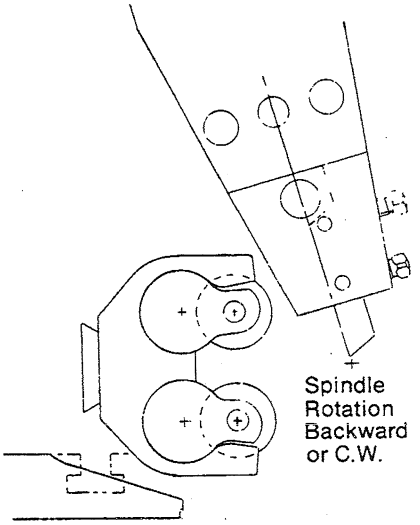


Figure 28 **Front Slide**
B10 Reed Thread Roll Attachment
— #2 Brown & Sharpe — 4 Slide

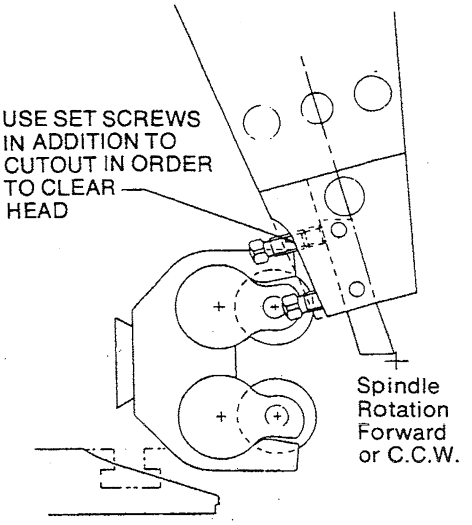


Figure 29 **Front Slide**
B10 Reed Thread Roll Attachment
— #2 Brown & Sharpe — 4 Slide

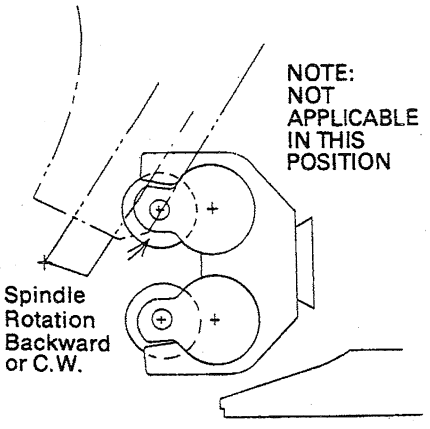


Figure 30 **Rear Slide**
B10 or B13 Reed Thread Roll
Attachment — #2 Brown & Sharpe
— 4 Slide

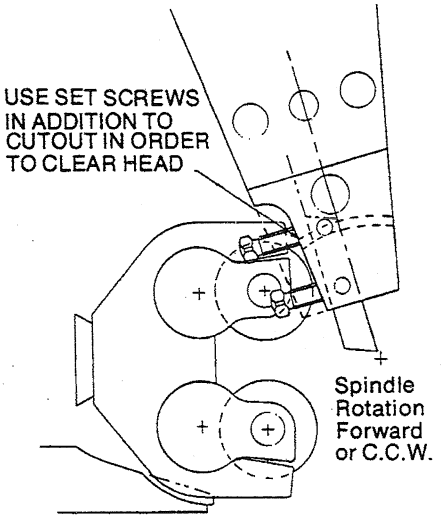


Figure 31 **Front Slide**
B13 Reed Thread Roll Attachment
— #2 Brown & Sharpe — 4 Slide

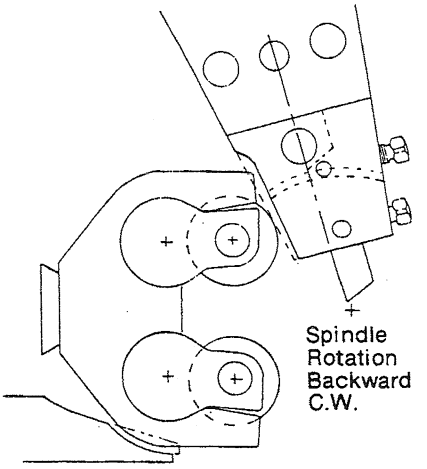
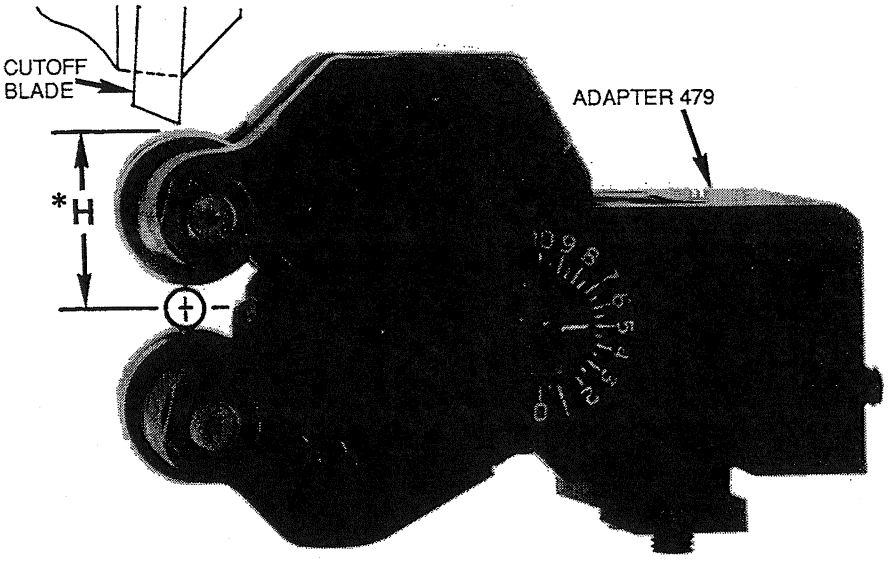


Figure 32 **Front Slide**
B13 Reed Thread Roll Attachment
— #2 Brown and Sharpe — 4 Slide

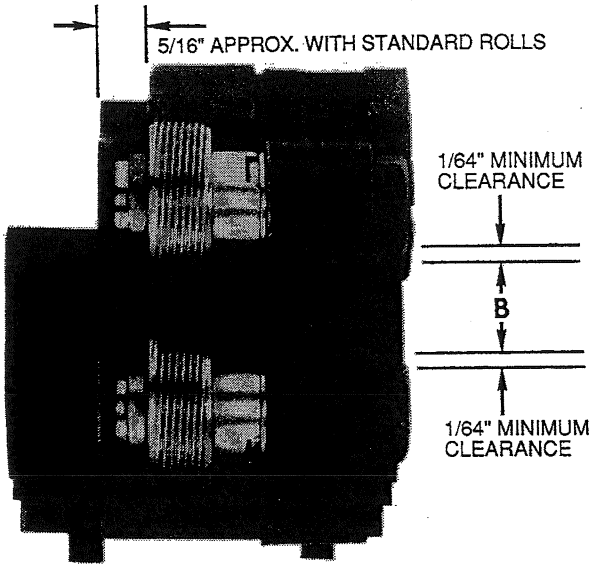
REED MODEL B5 THREAD ROLLING ATTACHMENT
SERIES B, TWO ROLL TYPE

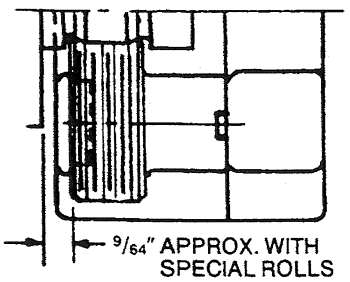
Illustrated for No. 00 Brown & Sharpe
Rear cross slide — counterclockwise spindle rotation



SLIDE ADJUSTED 1/4" TO REAR FROM NORMAL FORWARD POSITION

Single Spindle Automatic





SPECIAL ROLLS ARE AVAILABLE FOR POSITIONING CLOSER TO COLLET AS SHOWN. THESE ARE FURNISHED ONLY WHEN NECESSARY FOR SMALL DIAMETER WORK OR TO FACILITATE OTHER TOOLING REQUIREMENTS.

APPROX. TURRET TOOL DIA. CLEARANCE WHEN SLIDE IS IN RETRACTED POSITION:

* 1½" WITH 1" SLIDE TRAVEL
  1⅝" WITH 1 3/32" SLIDE TRAVEL

The Reed Model B-5 Thread Rolling Attachment is a floating straddle type, two roll attachment. The Model B-5 consists of two units — a head and an adapter. One set of roll pin support arms are adjustable to accommodate an infinite range of work diameters within its capacity.

The Head is held in the Adapter by an eccentric pivot pin. The setting of this pin, combined with the position of the adjustable arms, provides accurate positioning of the rolls with relation to the work. The free rocking movement of the Head provides automatic parallel alignment of the rolls with the center line of the work throughout the rolling cycle.

A simple device for precision matching provides a positive means of positioning both rolls for proper tracking. The advance compensator allows rolls of the same diameter to be used.

Table 10 — B-5 Application Data
for Unified and American External Screw Threads

(X) Indicates thread lengths can be rolled up to maximum allowed by working face of roll unless limited by springing or bending of the work. The thread lengths shown in the table should be used as a general guide only and are based on the highest figure in each Rockwell range. Under certain conditions, threads of longer lengths than shown can be rolled. Such applications should be referred to the factory.

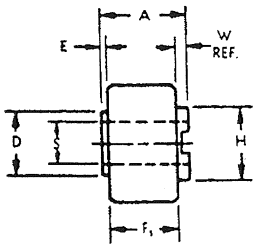
THREAD SIZE		N—NUMBER OF STARTS ON THREAD ROLL		THREAD LENGTH CAPACITY			H
DIAM.	THDS. PER INCH	B—SHOULDER DIAMETER*		BRASS OR ALUM.	CARBON OR ALLOY STEEL UP TO ROCKWELL C-15	CARBON OR ALLOY STEEL ROCKWELL C16-20 OR STAINLESS	SEE NOTE
2	56	N	14	X	1/2	3/8	1.000
		B	.405				
	64	N	13	X	1/2	3/8	.955
		B	.355				
3	48	N	12	X	7/16	5/16	.995
		B	.379				
	56	N	11	X	7/16	5/16	.945
		B	.355				
4	40	N	10	X	7/16	5/16	.930
		B	.340				
	48	N	10	X	7/16	5/16	.930
		B	.385				
5	40	N	9	X	3/8	1/4	.965
		B	.380				
	44	N	9	X	3/8	1/4	.980
		B	.384				
6	32	N	8	1/2	3/8	1/4	.910
		B	.325				
	40	N	8	X	3/8	1/4	.975
		B	.395				
8	32	N	7	1/2	5/16	1/4	.875
		B	.424				
	36	N	6	1/2	5/16	1/4	.900
		B	.335				
10	24	N	6	7/16	5/16	3/16	.980
		B	.420				
	28	N	6	7/16	5/16	3/16	.860
		B	.442				
	32	N	5	7/16	5/16	1/4	.885
		B	.330				
	36	N	5	1/2	5/16	1/4	.900
		B	.350				
	40	N	5	1/2	5/16	1/4	.915
		B	.365				
	48	N	5	1/2	3/8	1/4	.940
		B	.390				
	56	N	5	X	3/8	1/4	.955
		B	.410				
12	24	N	5	7/16	1/4	3/16	.970
		B	.425				

THREAD SIZE		N—NUMBER OF STARTS ON THREAD ROLL		THREAD LENGTH CAPACITY			H
DIAM.	THDS. PER INCH	B—SHOULDER DIAMETER*		BRASS OR ALUM.	CARBON OR ALLOY STEEL UP TO ROCKWELL C-15	CARBON OR ALLOY STEEL ROCKWELL C16-20 OR STAINLESS	SEE NOTE
12	28	N	5	7/16	1/4	3/16	1.000
		B	.160				
	32	N	5	7/16	5/16	3/16	.840
		B	.468				
	36	N	4	7/16	5/16	1/4	.855
		B	.315				
	40	N	4	1/2	5/16	1/4	.870
		B	.330				
	48	N	4	1/2	3/8	1/4	.890
		B	.350				
	56	N	4	1/2	3/8	1/4	.900
		B	.365				
1/4	20	N	4	3/8	1/4	3/16	.915
		B	.380				
	24	N	4	3/8	1/4	3/16	.950
		B	.415				
	28	N	4	3/8	5/16	3/16	.975
		B	.445				
	32	N	4	7/16	5/16	3/16	.995
		B	.470				
	36	N	4	7/16	5/16	1/4	1.010
		B	.485				
	40	N	4	7/16	5/16	1/4	1.020
		B	.500				
	48	N	4	7/16	5/16	1/4	1.040
		B	.520				
	56	N	3	1/2	5/16	1/4	.820
		B	.305				
5/16	18	N	3	5/16	1/4	3/16	.910
		B	.405				
	20	N	3	5/16	1/4	3/16	.930
		B	.425				
	24	N	3	3/8	1/4	3/16	.955
		B	.455				
	28	N	3	3/8	1/4	3/16	.980
		B	.480				
	32	N	3	3/8	1/4	3/16	.995
		B	.500				
	36	N	3	3/8	5/16	3/16	1.005
		B	.515				

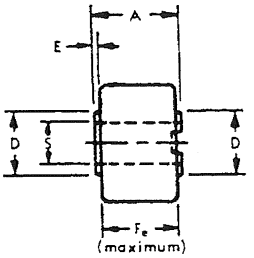
Note: Minimum distance from center line of work to cut off blade when vertical slide is in UP position. Standard travel of vertical slide is 1". Travel can be increased up to 1-3/32" by reducing diameter of cam roll.

*When using special rolls these dimensions are reduced by .130 when working face is less than .220. See Table 11.

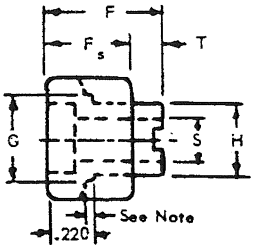
Table 11 — B-5 Dimensions of Basic Rolls



Standard Working Face
STANDARD ROLLS



Extended Working Face
STANDARD ROLLS



Standard Working Face
SPECIAL ROLLS

A	D	E	F_s	F_c	H	W	S	F	G	T
.580	.469	.010	.500	.560	.565	.070	.313	.685	.690	.185

Note: When the working face is less than .220 the reduction in shoulder diameter is for a length equal to the difference between .220 less the working face.

To determine the width of working face of thread roll for the required thread length, refer to the section on chart on page 47.

To assemble thread rolls, the roll pin is removed by removing the locknut and turning pin by means of a screwdriver until it is free of geared arm. (Refer to Fig. 33) The rolls are inserted and roll pin threaded into geared arm and the roll pin locknut tightened. It is important that the correct clearance between the roll and the bearing is obtained. These dimensions are given as "C" in Table 13.

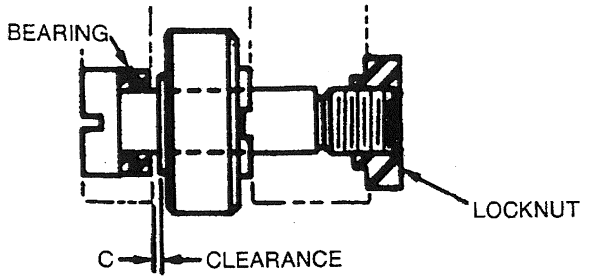


Fig. 33

Figure 34 illustrates setting of the eccentric pin to position the head for proper alignment of the rolls in relation to the horizontal center line of the work.

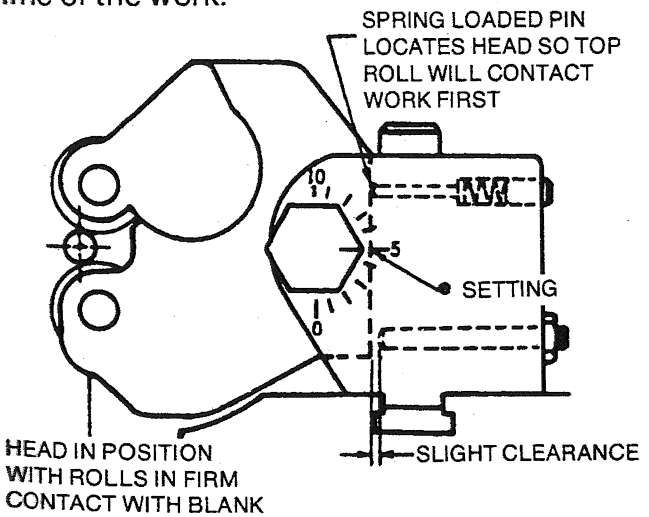


Fig. 34

With the eccentric pin locknut loosened, the pin is rotated to the correct eccentric setting "e" given in Table 13. These settings refer to graduations marked on adapter. The locknut is tightened securely holding head in proper position.

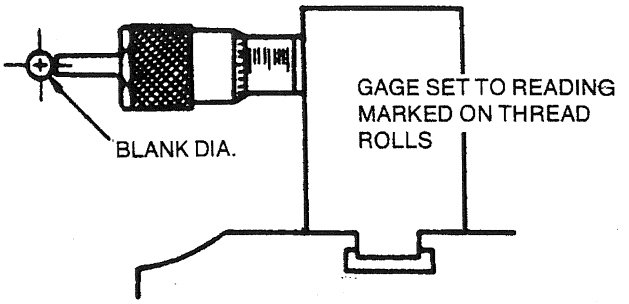


Fig. 35

Set micrometer forward positioning gage to the reading marked on the thread rolls. Assemble the gage to the cross slide. Position machine cross slide in the extreme forward position at the high point of its actuating cam. Adjust cross slide until contact screw of the micrometer lightly contacts the work blank which has been formed to the correct rolling diameter.

Operate the machine to return the cross slide to full retracted position. Remove the gage from the cross slide. Assemble the attachment to the cross slide. This will automatically position the center line of the rolls on the center line of the work at the time the thread rolling attachment is in its full forward rolling position and the cross slide is on the high point of the cam.

Table 12 — B-5 Suggested Work Revolutions for Rolling

Threads per Inch	Brass or Alum.	Carbon or Alloy Steel up to Rockwell C-15	Carbon or Alloy Steel Rockwell C16-20 or Stainless
64	* 8-10	* 9-11	*11-12
56	* 8-10	* 9-11	*11-12
48	* 8-10	* 9-11	*11-12
44	* 9-11	*10-12	*12-14
40	* 9-11	*10-12	*12-14
36	*10-12	*11-13	13-15
32	*10-12	*11-13	13-15
28	*10-12	*11-13	13-15
27	*11-13	12-14	14-16
24	*11-13	12-14	14-16
20	12-14	13-15	16-18
18	12-14	13-15	16-18

In most cases it is necessary to know the feed per revolution of the work in order to design or select the proper cam for thread rolling. The following formula can be used for converting the values of work revolutions given in the table to feed per revolution:

$$F=\frac{M}{R}$$

Where F=cross slide feed per revolution of the work

M=thread roll advance (refer to Table 13)

R=Suggested number of work revolutions for rolling from the table

*For diameters less than ¼" on unsupported work use from 12 to 18 work revolutions.

Table 13 — B-5 Setup Information

Thread roll Advance "M" is the distance between initial contact of the thread rolls with the work to full rolling position on the center line of the work.

This table gives the thread roll advance for Unified and American Standard External Screw Threads.

Thread roll advance for any thread size not covered by these tables may be determined by either the graph or formula on pages 57 and 58.

THREAD SIZE		N—NUMBER OF STARTS ON THREAD ROLL M—MAXIMUM THREAD ROLL ADVANCE		C RECOMMENDED CLEARANCE (REFER TO FIG. 33)	E ECCENTRIC SETTING (REFER TO FIG. 34)
DIAM.	THDS. PER INCH				
2	56	N	14	.002	
		M	.060		8-1/2
	64	N	13	.002	
		M	.060		10
3	48	N	12	.002	
		M	.080		9
	56	N	11	.002	
		M	.050		10
4	40	N	10	.003	
		M	.090		10
	48	N	10	.002	
		M	.098		10
5	40	N	9	.003	
		M	.080		10
	44	N	9	.003	
		M	.080		8-1/2
6	32	N	8	.003	
		M	.090		10
	40	N	8	.003	
		M	.080		9
8	32	N	7	.003	
		M	.090		6-1/2
	36	N	6	.003	
		M	.090		10
10	24	N	6	.004	
		M	.110		7-1/2
	28	N	5	.004	
		M	.100		6
	32	N	6	.003	
		M	.100		10
	36	N	5	.003	
		M	.090		10
	40	N	5	.003	
		M	.080		10
	48	N	5	.002	
		M	.080		10
	56	N	5	.002	
		M	.060		8
12	24	N	5	.004	
		M	.110		7-1/2

THREAD SIZE		N—NUMBER OF STARTS ON THREAD ROLL M—MAXIMUM THREAD ROLL ADVANCE		C RECOMMENDED CLEARANCE (REFER TO FIG. 33)	E ECCENTRIC SETTING (REFER TO FIG. 34)
DIAM.	THDS. PER INCH				
12	28	N	5	.004	
		M	.110		6
	32	N	5	.003	
		M	.100		5
	36	N	4	.003	
		M	.090		10
	40	N	4	.003	
		M	.080		10
	48	N	4	.002	
		M	.080		10
	56	N	4	.002	
		M	.050		10
1/4	20	N	4	.005	
		M	.120		10
	24	N	4	.004	
		M	.110		7-1/2
	28	N	4	.004	
		M	.110		6 1/2
	32	N	4	.003	
		M	.100		5-1/2
	36	N	4	.003	
		M	.090		5
	40	N	4	.003	
		M	.090		4-1/2
	48	N	4	.002	
		M	.080		3-1/2
	56	N	3	.002	
		M	.050		10
5/16	18	N	3	.005	
		M	.130		8-1/2
	20	N	3	.005	
		M	.120		7-1/2
	24	N	3	.004	
		M	.120		6
	28	N	3	.004	
		M	.110		5
	32	N	3	.003	
		M	.100		4-1/2
	36	N	3	.003	
		M	.100		4

Table 14 — Diameter Capacities

for Unified and American External Screw Threads

When the shoulder clearance designated is less than the amount required, it is possible to obtain additional clearance at the solid arm side of the attachment. Additional clearance at this side of the attachment is sometimes needed to clear the stock diameter which may be larger than the shoulder on the part.

This can be accomplished by using special solid arms or altering standard solid arms as shown in Figure 36. All applications where additional clearance is needed at the solid arm side of the attachment should be referred to the factory.

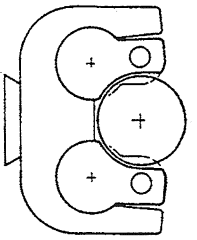


FIG. 36

Thread Roll Head	*Additional Shoulder Clearance Allowable
B8	.140
B10	.220
B13	.270
B18	.300
B36	.300

*Add these dimensions to shoulder clearance "B" given in Tables 16 through 18 to determine clearance possible at solid arm side of attachment.

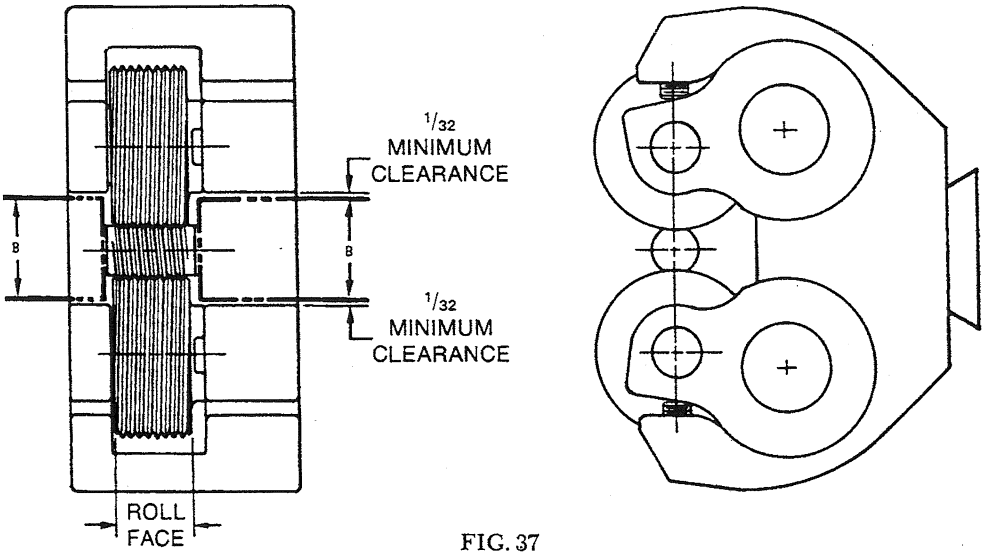


FIG. 37

Table 15 — Standard Head Capacity

Thread Roll Head	Thread Diameter Range (Standard)		Roll Face Width** (Standard)
	Min.	Max.*	
B8	0	½"	½"
B10	0	⅝"	⅝"
B13	⅛"	13/16"	⅞"
B18	¼"	1⅛"	1⅛"
B36	⅜"	2¼"	1⅛"

*The standard range of thread diameters indicates that all thread sizes within this range can be rolled. Certain sizes above these ranges may also be rolled as listed on pages 40 and 41.

**Rolls providing extra thread length capacity can be furnished. This design of roll is explained in the section on Thread Roll Selection, page 46.

Table 16 — Diameter Capacities

B — Shoulder Diameter N — Number of Starts on Thread Roll

THREAD SIZE			THREAD ROLL HEADS				
DIAM.	THDS. PER INCH		B8	B10	B13	B18	B36
2	56	N	15	18			
		B	.452	.538			
	64	N	15	18			
		B	.486	.580			
3	48	N	13	16			
		B	.457	.574			
	56	N	13	15			
		B	.497	.541			
4	40	N	12	15			
		B	.495	.641			
	48	N	11	14			
		B	.456	.613			
5	40	N	10	13	15		
		B	.463	.648	.660		
	44	N	10	12	15		
		B	.487	.575	.694		
6	32	N	10	12	14		
		B	.541	.638	.664		
	40	N	9	11	13		
		B	.492	.601	.640		
8	32	N	8	9	11		
		B	.557	.573	.653		
	36	N	7	9	11		
		B	.451	.606	.693		
10	24	N	7	8	10		
		B	.551	.582	.695		
	28	N	6	8	10		
		B	.442	.634	.757		
	32	N	6	8	10		
		B	.472	.673	.807		
	36	N	6	8	9		
		B	.496	.705	.679		
	40	N	6	7	9		
		B	.515	.562	.706		
	48	N	6	7	9		
		B	.544	.595	.746		
	56	N	6	7	9		
		B	.564	.618	.775		
12	24	N	6	7	9		
		B	.582	.640	.804		
	28	N	5	7	8		
		B	.442	.686	.680		
	32	N	5	7	8		
		B	.468	.723	.719		
	36	N	5	6	8		
		B	.489	.559	.750		
	40	N	5	6	8		
		B	.505	.579	.774		
	48	N	5	6	8		
		B	.530	.607	.810		
	56	N	5	6	8		
		B	.548	.628	.836		
1/4	20	N	5	6	8	9	
		B	.561	.645	.865	.938	
	24	N	5	6	7	9	
		B	.610	.702	.724	1.019	
	28	N	5	6	7	9	
		B	.646	.743	.771	1.076	
	32	N	4	6	7	9	
		B	.453	.776	.805	1.119	
	36	N	4	5	7	9	
		B	.470	.575	.832	1.152	
	40	N	4	5	7	8	
		B	.484	.591	.854	.954	
	48	N	4	5	7	8	
		B	.505	.616	.889	.990	
	56	N	4	5	6	8	
		B	.520	.633	.678	1.016	

THREAD SIZE			THREAD ROLL HEADS				
DIAM.	THDS. PER INCH		B8	B10	B13	B18	B36
5/16	18	N	4	5	6	7	
		B	.644	.785	.857	.991	
	20	N	4	5	6	7	
		B	.671	.820	.895	1.034	
	24	N	3	4	6	7	
		B	.441	.595	.954	1.089	
	28	N	3	4	5	7	
		B	.465	.624	.715	1.145	
	32	N	3	4	5	7	
		B	.483	.647	.741	1.179	
	36	N	3	4	5	7	
		B	.497	.664	.762	1.206	
	40	N	3	4	5	7	
		B	.508	.668	.778	1.228	
	48	N	3	4	5	7	
		B	.525	.699	.803	1.261	
3/8	16	N	3	4	5	6	8
		B	.606	.803	.931	1.121	1.563
	18	N	3	4	5	6	8
		B	.634	.837	.972	1.168	1.623
	20	N	3	4	5	6	8
		B	.657	.865	1.008	1.206	1.671
	24	N	3	4	4	6	7
		B	.690	.910	.720	1.263	1.409
	28	N	3	3	4	6	7
		B	.714	.596	.749	1.304	1.456
	32	N	3	3	4	6	7
		B	.733	.615	.772	1.334	1.490
	36	N	3	3	4	5	7
		B	.747	.629	.789	1.011	1.517
	40	N	3	3	4	5	1
		B	.758	.640	.803	1.028	1.539
7/16	14	N	2	3	4	5	7
		B	.450	.701	.884	1.128	1.678
	16	N	2	3	4	5	7
		B	.478	.738	.928	1.180	1.747
	18	N	2	3	4	5	6
		B	.500	.766	.962	1.230	1.417
	20	N	2	3	4	5	6
		B	.517	.788	.990	1.254	1.455
	24	N	2	3	4	5	6
		B	.543	.822	1.032	1.303	1.512
	28	N	2	3	4	5	6
		B	.562	.846	1.061	1.338	1.553
	32	N	2	3	3	5	6
		B	.576	.864	.677	1.365	1.583
1/2	12	N	2	3	3	4	6
		B	.600	.903	.716	1.012	1.665
	13	N	2	3	3	4	6
		B	.620	.929	.742	1.043	1.708
	14	N	2	3	3	4	6
		B	.637	.951	.764	1.071	1.746
	16	N	2	3	3	4	6
		B	.665	.987	.800	1.115	1.807
	18	N	2	3	3	4	6
		B	.687	1.019	.828	1.149	1.857
	20	N	2	3	3	4	5
		B	.704	1.041	.851	1.177	1.440
	24	N	2	2	3	4	5
		B	.730	.612	.884	1.219	1.490
	28	N	2	2	3	4	5
		B	.749	.631	.909	1.248	1.525
	32	N	2	2	3	4	5
		B	.763	.645	.927	1.270	1.551

THREAD SIZE			THREAD ROLL HEADS			
DIAM.	THDS. PER INCH		B10	B13	B18	B36
9/16	12	N	2	3	4	5
		B	.670	.966	1.324	1.619
	14	N	2	3	4	5
		B	.670	1.014	1.324	1.619
	16	N	2	3	4	5
		B	.735	1.050	1.427	1.741
	18	N	2	3	4	5
		B	.756	1.078	1.462	1.782
	20	N	2	3	4	5
		B	.774	1.100	1.489	1.815
	24	N	2	3	4	5
		B	.800	1.134	1.531	1.864
	28	N	2	3	4	5
		B	.818	1.158	1.560	1.899
	32	N	2		3	5
		B	.832	1.176	1.051	1.926
5/8	11	N	2	3	3	5
		B	.833	1.185	1.060	1.949
	12	N	2	2	3	4
		B	.857	.670	1.090	1.448
	14	N	2	2	3	4
		B	.894	.707	1.138	1.507
	16	N	2	2	3	4
		B	.922	.735	1.174	1.551
	18	N	2	2	3	4
		B	.943	.756	1.203	1.586
	20	N	2	2	3	4
		B	.961	.774	1.225	1.613
	24	N	2	2	3	4
		B	.987	.800	1.259	1.655
	32	N	2	2	3	4
		B	1.005	.818	1.283	1.684
	32	N	2	2	3	4
		B	1.019	.832	1.301	1.707
11/16	12	N		2	3	4
		B		.857	1.340	1.760
	24	N		2	3	4
		B		.987	1.508	1.967
	32	N		2	3	4
		B		1.020	1.551	2.019
3/4	10	N		2	3	4
		B		.993	1.522	1.989
	12	N		2	3	4
		B		1.044	1.590	2.072
	14	N		2	3	3
		B		1.081	1.638	1.450
	16	N		2	3	3
		B		1.109	1.674	1.486
	18	N		2	3	3
		B		1.134	1.702	1.514
	20	N		2	3	3
		B		1.148	1.724	1.536
	24	N		2	3	3
		B		1.174	1.758	1.570
	28	N		2	3	3
		B		1.193	1.782	1.594
	32	N		2	3	3
		B		1.207	1.800	1.612
13/16	12	N		2	2	3
		B		1.232	1.107	1.651
	16	N		2	2	3
		B		1.297	1.172	1.736
	20	N		2	2	3
		B		1.336	1.211	1.786

All "B" are three place decimal

Table 16 — Diameter Capacities (Continued)

N — Number of Starts on Thread Roll

B — Shoulder Diameter

THREAD SIZE			THREAD ROLL HEADS			
DIAM.	THDS. PER INCH		B10	B13	B18	B36
7/8	9	N			2	3
		B			1.208	1.789
	10	N			2	3
		B			1.242	1.834
	12	N			2	3
		B			1.294	1.901
	14	N			2	3
		B			1.331	1.949
	16	N			2	3
		B			1.357	1.985
	18	N			2	3
		B			1.381	2.013
	20	N			2	3
		B			1.398	2.036
	24	N			2	3
		B			1.424	2.070
	28	N			2	3
		B			1.443	2.094
	32	N			2	3
		B			1.457	2.112
15/16	12	N			2	3
		B			1.481	2.151
	16	N			2	3
		B			1.546	2.235
	20	N			2	3
		B			1.585	2.287
1	8	N			2	3
		B			1.539	2.233
	10	N			2	3
		B			1.617	2.333
	12	N			2	2
		B			1.669	1.481
	14	N			2	2
		B			1.706	1.518
	16	N			2	2
		B			1.734	1.546
	18	N			2	2
		B			1.755	1.567
	20	N			2	2
		B			1.773	1.585
	24	N		1	2	2
		B		.980	1.779	1.611
	28	N		1	2	2
		B		.990	1.817	1.629
	32	N		1	2	2
		B		1.000	1.831	1.643
1 1/16	12	N			2	2
		B			1.856	1.668
	16	N		1	2	2
		B		1.060	1.920	1.733
	18	N		1	2	2
		B		1.080	1.920	1.754
1 1/8	8	N			2	2
		B			1.914	1.726
	10	N			2	2
		B			1.920	1.803
	12	N		1	2	2
		B		1.123	1.920	1.855
	14	N		1	2	2
		B		1.149	1.920	1.892
	16	N		1	2	2
		B		1.169	1.920	1.920
	18	N		1	2	2
		B		1.184	1.920	1.942
	20	N		1	2	2
		B		1.196	1.920	1.959
	24	N		1	2	2
		B		1.215	1.920	1.985
	28	N		1	2	2
		B		1.228	1.920	2.004
1 3/16	12	N		1		2
		B		1.248		2.043
	16	N		1	1	2
		B		1.294	1.180	2.107
	18	N		1	1	2
		B		1.309	1.184	2.129

THREAD SIZE			THREAD ROLL HEADS			
DIAM.	THDS. PER INCH		B10	B13	B18	B36
1-1/4	8	N				2
		B				2.100
	10	N				2
		B				2.178
	12	N			1	2
		B			1.248	2.230
	14	N			1	2
		B			1.274	2.267
	16	N			1	2
		B			1.294	2.295
	18	N			1	2
		B			1.309	2.316
	20	N			1	2
		B			1.321	2.334
	24	N			1	2
		B			1.340	2.360
1-5/16	12	N			1	2
		B			1.373	2.417
	16	N			1	2
		B			1.419	2.482
	18	N			1	2
		B			1.434	2.504
1 3/8	8	N			1	2
		B			1.407	2.475
	10	N			1	2
		B			1.461	2.553
	12	N			1	2
		B			1.498	2.620
	14	N			1	2
		B			1.524	2.630
	16	N			1	2
		B			1.544	2.630
	18	N			1	2
		B			1.559	2.630
	20	N			1	2
		B			1.571	2.630
	24	N			1	2
		B			1.589	2.630
1 7/16	12	N			1	2
		B			1.623	2.630
	16	N			1	1
		B			1.669	1.481
	18	N			1	1
		B			1.684	1.496
1-1/2	8	N			1	
		B			1.657	
	10	N			1	1
		B			1.711	1.523
	12	N			1	1
		B			1.748	1.560
	14	N			1	1
		B			1.774	1.586
	16	N			1	1
		B			1.793	1.605
	18	N			1	1
		B			1.809	1.621
	20	N			1	1
		B			1.821	1.633
	24	N			1	1
		B			1.839	1.651
1-9/16	16	N			1	1
		B			1.918	1.730
	18	N			1	1
		B			1.920	1.746
1-5/8	8	N			1	1
		B			1.906	1.718
	10	N			1	1
		B			1.920	1.773
	12	N			1	1
		B			1.920	1.810
	14	N			1	1
		B			1.920	1.836
	16	N			1	1
		B			1.920	1.855
	18	N			1	1
		B			1.920	1.870
	20	N			1	1
		B			1.920	1.883

THREAD SIZE			THREAD ROLL HEADS			
DIAM.	THDS. PER INCH		B10	B13	B18	B36
1-11/16	16	N				1
		B				1.980
	18	N				1
		B				1.995
1-3/4	8	N				1
		B				1.968
	10	N				1
		B				2.023
	12	N				1
		B				2.059
	14	N				1
		B				2.085
	16	N				1
		B				2.105
	18	N				1
		B				2.120
	20	N				1
		B				2.132
1-13/16	16	N				1
		B				2.230
1-7/8	8	N				1
		B				2.218
	10	N				1
		B				2.273
	12	N				1
		B				2.309
	14	N				1
		B				2.335
	16	N				1
		B				2.355
	18	N				1
		B				2.370
	20	N				1
		B				2.382
1-15/16	16	N				1
		B				2.480
2	8	N				1
		B				2.468
	10	N				1
		B				2.523
	12	N				1
		B				2.559
	14	N				1
		B				2.585
	16	N				1
		B				2.605
	18	N				1
		B				2.620
	20	N				1
		B				2.630
2-1/16	16	N				1
		B				2.630
2-1/8	8	N				1
		B				2.630
	12	N				1
		B				2.630
	16	N				1
		B				2.630
2-3/16	16	N				1
		B				2.630
2-1/4	8	N				1
		B				2.630
	10	N				1
		B				2.630
	12	N				1
		B				2.630
	14	N				1
		B				2.630
	16	N				1
		B				2.630
	18	N				1
		B				2.630
	20	N				1
		B				2.630

Table 17 — Diameter Capacities
for American Standard External Taper Pipe Threads

B — Shoulder Diameter N — Number of Starts on Thread Roll

Pipe Size		Thread Roll Heads				
		B8	B10	B13	B18	B36
1/16-27	N	4	4	5	7	
	B	.710	.580	.650	1.060	
1/8-27	N	3	3	4	5	
	B	.810	.690	.850	1.080	
1/4-18	N	2	2	3	4	5
	B	.790	.670	.940	1.280	1.560
3/8-18	N		2	2	3	4
	B		1.060	.880	1.350	1.770
1/2-14	N			2	2	3
	B			1.310	1.180	1.740
3/4-14	N				2	2
	B				1.810	1.630
1-11½	N					2
	B					2.360
1¼-11½	N					1
	B					1.850
1½-11½	N					1
	B					2.320

ROLL FACE WIDTHS — STANDARD

Pipe Size	*Roll Face Width (Standard)	L_2 Thread Lengths (Standard)
1/16-27	.354	.261
1/8-27	.357	.264
1/4-18	.541	.402
3/8-18	.547	.408
1/2-14	.712	.534
3/4-14	.724	.546
1-11½	.900	.683
1¼-11½	.924	.707
1½-11½	.941	.724

*Applies to all sizes of heads and is equal to the L_2 thread lengths plus 2½ pitches for rolling threads to the standard L_2 lengths. Working face includes 45° bevels on both edges.

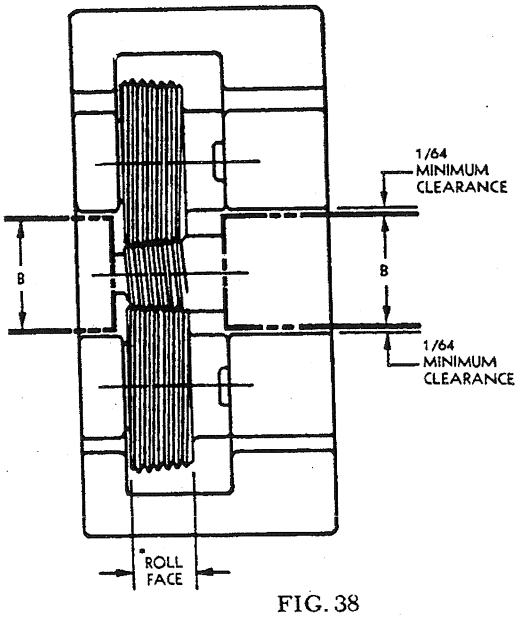


FIG. 38

Shown in the table above are the standard external taper pipe threads that can be rolled in each size thread roll head.

Each head provides sufficient capacity for rolling the standard L_2 length of thread for the pipe sizes shown in this table for the range of materials listed in Table 20 on pages 45 and 46.

Table 18 — Diameter Capacities
for American Standard External Straight Pipe Threads
B — Shoulder Diameter N — Number of Starts on Thread Roll

Pipe Size		Thread Roll Heads														
		NPSL					NPSM					NPSH			NH	
		B8	B10	B13	B18	B36	B8	B10	B13	B18	B36	B13	B18	B36	B18	B36
1/8-27	N	3	3	4	5	6	3	3	4	5	6					
	B	.860	.730	.920	1.160	1.350	.820	.700	.870	1.100	1.280					
1/4-18	N	2	2	3	4	5	2	2	3	4	5					
	B	.820	.700	.990	1.350	1.650	.780	.660	.940	1.280	1.570					
3/8-18	N		2	2	3	4		2	2	3	4					
	B		1.100	.920	1.410	1.850		1.070	.880	1.350	1.780					
1/2-14	N			2	2	3			2	2	3	2	2	3		
	B			1.360	1.230	1.820			1.310	1.180	1.750	1.310	1.180	1.750		
½-11½	N														2	2
	B														1.850	1.660
5/8-11½	N														2	2
	B														1.850	1.660
3/4-14	N				2	2				2	2		2	2		
	B				1.860	1.680				1.810	1.630		1.810	1.630		
3/4-11½	N														2	2
	B														1.850	1.660
1-11½	N				1	2				1	2		1	2		
	B				1.370	2.420				1.330	2.360		1.330	2.360		
1¼-11½	N					1					1			1		
	B					1.880					1.840			1.840		
1½-11½	N					1					1			1		
	B					2.350					2.310			2.310		

Table 19 — Diameter Capacities

Metric Thread Sizes

B — Shoulder Diameter N — Number of Starts on Thread Roll

THREAD SIZE			THREAD ROLL HEADS					
Diam.	Pitch		B5	B8	B10	B13	B18	B36
M1.8	0.35	N B	16 .334	18 .448				
M2.0	0.4	N B	15 .372	16 .436				
M2.2	0.45	N B	13 .330	15 .468	18 .558			
M2.5	0.45	N B	11 .333	13 .495	15 5.39			
M3.0	0.50	N B	9 .349	10 .448	13 .618	15 .637		
M3.5	0.60	N B	8 .392	9 .506	11 .618	13 .660		
M4.0	0.70	N B	7 .404	8 .534	9 .547	12 .752		
M4.5	0.75	N B	6 .397	7 .546	8 .576	10 .687		
M5.0	0.80	N B	5 .355	6 .522	7 .570	9 .716		
M6.0	1.00	N B	4 .346	5 .545	6 .625	8 .835	10 1.107	
M7.0	1.00	N B	3 .305	4 .543	5 .662	6 .713	8 1.064	
M8.0	1.00	N B	3 .462	3 .462	4 .622	5 .712	7 1.141	9 1.507
M8.0	1.25	N B	3 .423	4 .691	4 .573	6 .922	7 1.065	9 1.413
M10	1.00	N B		3 .777	3 .659	4 .828	5 1.059	7 1.583
M10	1.25	N B		3 .738	3 .620	4 .779	5 1.001	7 1.507
M10	1.50	N B		3 .698	3 .580	4 .731	6 1.281	7 1.431
M12	1.25	N B		2 .627	3 .934	3 .747	4 1.048	6 1.711
M12	1.75	N B		2 .565	3 .855	3 .668	5 1.357	6 1.577
M14	1.50	N B			2 .714	3 1.022	4 1.392	5 1.699
M14	2.00	N B			2 .653	3 .943	4 1.295	5 1.584
M16	1.50	N B			2 .950	2 .763	3 1.212	4 1.598

For thread sizes not shown within capacity of attachment refer to factory.

Table 19 — Diameter Capacities (Continued)

Metric Thread Sizes

B — Shoulder Diameter N — Number of Starts on Thread Roll

THREAD SIZE			THREAD ROLL HEADS					
Diam.	Pitch		B5	B8	B10	B13	B18	B36
M16	2.00	N B			2 .889	2 .702	3 1.133	4 1.500
M18	1.50	N B				2 .999	3 1.527	4 1.991
M18	2.50	N B				2 .877	3 1.368	4 1.797
M20	1.50	N B				2 1.236	2 1.111	3 1.654
M20	2.50	N B				2 1.113	3 1.683	3 1.495
M22	1.50	N B					2 1.347	3 1.969
M22	2.50	N B					2 1.224	3 1.810
M24	2.00	N B					2 1.521	3 2.204
M24	3.00	N B					2 1.399	3 2.046
M27	2.00	N B					2 1.786	2 1.688
M27	3.00	N B					2 1.754	2 1.566
M30	2.00	N B						2 2.042
M30	3.50	N B					2 2.047	2 1.859
M33	2.00	N B					1 1.360	2 2.396
M33	3.50	N B						2 2.213
M36	3.00	N B					1 1.510	2 2.628
M36	4.00	N B					1 1.424	2 2.507
M39	3.00	N B					1 1.746	1 1.558
M39	4.00	N B					1 1.660	
M42	4.50	N B					1 1.853	1 1.665

For thread sizes not shown within capacity of attachment refer to factory.

Table 20 — Approximate Thread Length Capacities
for Unified External Screw Threads

Refer to Table 17 for External Taper Pipe Threads. For external straight pipe threads use the diameters in the table closest to the thread diameter of the straight pipe size to be rolled.

The thread lengths shown in the table should be used as a general guide only. Under certain conditions, threads of longer lengths than shown can be rolled. Such applications should be referred to the factory.

(X) Indicates thread lengths can be rolled up to maximum allowed by working face of roll unless limited by springing or bending of work. To determine the working face of thread roll for the required thread length, refer to Selection of Thread Rolls, page 46.

HREAD SIZE		Thread Roll Heads														
		B8			B10			B13			B18			B36		
m.	Thds. per Inch	Brass or Alum.	Carbon or Alloy Steel up to Rockwell C-15	Carbon or Alloy Steel Rockwell C16-20 or Stainless	Brass or Alum.	Carbon or Alloy Steel up to Rockwell C-15	Carbon or Alloy Steel Rockwell C16-20 or Stainless	Brass or Alum.	Carbon or Alloy Steel up to Rockwell C-15	Carbon or Alloy Steel Rockwell C16-20 or Stainless	Brass or Alum.	Carbon or Alloy Steel up to Rockwell C-15	Carbon or Alloy Steel Rockwell C16-20 or Stainless	Brass or Alum.	Carbon or Alloy Steel up to Rockwell C-15	Carbon or Alloy Steel Rockwell C16-20 or Stainless
	56	X	X	X	X	X	X									
	64	X	X	X	X	X	X									
	48	X	X	X	X	X	X									
	56	X	X	X	X	X	X									
	40				X	X	X									
	48				X	X	X									
	40				X	X	X	X	X	X						
	44				X	X	X	X	X	X						
	32	X	X	X	X	X	X	X	X	X						
	40	X	X	X	X	X	X	X	X	X						
	32	X	X	X	X	X	X	X	X	X						
	36	X	X	X	X	X	X	X	X	X						
)	24	X	X	1/2	X	X	5/8	X	X	X						
	28	X	X	1/2	X	X	X	X	X	X						
	32	X	X	1/2												
	36	X	X	1/2												
	40	X	X	X												
	48	X	X	X												
	56	X	X	X												
2	24	X	X	7/16	X	X	9/16	X	X	X						
	28	X	X	7/16	X	X	5/8	X	X	X						
	32	X	X	1/2	X	X	X	X	X	X						
	36	X	X	1/2												
	40	X	X	X												
	48	X	X	X												
	56	X	X	X												
ι	20	X	X	7/16	X	X	1/2	X	X	X	X	X	X			
	24	X	X	7/16												
	28	X	X	7/16	X	X	9/16	X	X	X	X	X	X			
	32	X	X	1/2	X	X	5/8	X	X	X	X	X	X			
	36	X	X	1/2												
	40	X	X	1/2												
	48	X	X	X												
	56	X	X	X												
16	18	X	1/2	3/8	X	X	7/16	X	X	7/8	X	X	1-1/8			
	20	X	1/2	3/8												
	24	X	X	7/16	X	X	1/2	X	X	X	X	X	X			
	28	X	X	7/16												
	32	X	X	7/16	X	X	9/16	X	X	X	X	X	X			
	36	X	X	9/16												
	40	X	X	1/2												
	48	X	X	1/2												
⅝	16	X	7/16	3/8	X	X	7/16	X	X	13/16	X	X	1-1/16	X	X	X
	18	X	7/16	3/8												
	20	X	1/2	3/8												
	24	X	1/2	7/16	X	X	1/2	X	X	7/8	X	X	1-1/8	X	X	X
	28	X	1/2	7/16												
	32	X	X	7/16	X	X	9/16	X	X	X	X	X	X	X	X	X
	36	X	X	1/2												
	40	X	X	1/2												
'16	14	X	7/16	5/16	X	5/8	3/8	X	X	3/4	X	X	1	X	X	X
	16	X	7/16	5/16												
	18	X	1/2	3/8												
	20	X	1/2	3/8	X	X	7/16	X	X	13/16	X	X	1-1/8	X	X	X
	24	X	1/2	3/8												
	28	X	X	7/16	X	X	1/2	X	X	7/8	X	X	X	X	X	X
	32	X	X	7/16												
½	12	X	3/8	1/4												
	13	X	3/8	1/4	X	9/16	3/8	X	X	11/16	X	X	15/16	X	X	X
	14	X	3/8	5/16												
	16	X	7/16	5/16												
	18	X	7/16	5/16												
	20	X	7/16	5/16												
	24	X	1/2	3/8	X	5/8	7/16	X	X	3/4	X	X	1-1/16	X	X	X
	28	X	1/2	3/8	X	X	1/2	X	X	13/16	X	X	1-1/8	X	X	X
	32	X	1/2	3/8												
/16	12				X	1/2	5/16	X	X	5/8	X	X	15/16	X	X	1-1/8
	18				X	9/16	3/8	X	X	11/16	X	X	1	X	X	X
	24				X	5/8	7/16	X	X	3/4	X	X	1-1/16	X	X	X
⅝	11				X	1/2	5/16	X	X	5/8	X	1-1/8	7/8	X	X	1-1/16
	18				X	9/16	3/8	X	X	11/16	X	X	15/16	X	X	1-1/8
	24				X	5/8	7/16	X	X	3/4	X	X	1	X	X	X

Table 20 — Approximate Thread Length Capacities (Continued)

for Unified External Screw Threads

(X)Indicates thread lengths can be rolled up to maximum allowed by working face of roll unless limited by springing or bending of work.

THREAD SIZE		Thread Roll Heads														
		B8			B10			B13			B18			B36		
Diam.	Thds. per Inch	Brass or Alum.	Carbon or Alloy Steel up to Rockwell C-15	Carbon or Alloy Steel Rockwell C16-20 or Stainless	Brass or Alum.	Carbon or Alloy Steel up to Rockwell C-15	Carbon or Alloy Steel Rockwell C16-20 or Stainless	Brass or Alum.	Carbon or Alloy Steel up to Rockwell C-15	Carbon or Alloy Steel Rockwell C16-20 or Stainless	Brass or Alum.	Carbon or Alloy Steel up to Rockwell C-15	Carbon or Alloy Steel Rockwell C16-20 or Stainless	Brass or Alum.	Carbon or Alloy Steel up to Rockwell C-15	Carbon or Alloy Steel Rockwell C16-20 or Stainless
¾	10 16 20							X X X	13/16 7/8 X	9/16 5/8 11/16	X X X	1-1/16 1-1/8 X	13/16 7/8 15/16	X X X	X X X	1 1-1/16 1-1/8
⅞	9 14 20										X X X	1 1-1/16 1-1/8	3/4 13/16 7/8	X X X	X X X	15/16 1 1-1/16
1	8 14 20										X X X	15/16 1 1-1/16	11/16 3/4 13/16	X X X	X X X	7/8 15/16 1
1⅛	8 12 18										X X X	7/8 15/16 1	5/8 11/16 3/4	X X X	X X X	7/8 15/16 1
1¼	8 12 18													X X X	1-1/8 X X	13/16 7/8 15/16
1⅜	8 12 18													X X X	1-1/8 X X	13/16 7/8 15/16
1½	8 12 18													X X X	1-1/8 X X	13/16 7/8 15/16
1⅝	8 12 18													X X X	1-1/16 1- 1/8 X	3/4 13/16 7/8
1¾	8 12 16													X X X	1-1/16 1-1/8 X	3/4 13/16 7/8
2	8 12 16													X X X	1 1-1/16 1-1/8	3/4 13/16 7/8
2¼	8 12 16													X X X	15/16 1 1-1/16	11/16 3/4 13/16

SELECTION OF THREAD ROLLS

Although the thread diameter capacities listed in Tables 14 through 20 would apply to work of any design, in many cases the requirements of the application will not permit the use of rolls with standard face widths. Rolls of special design must then be considered. This section completely describes the selection and design of these rolls.

The selection of the proper Thread Rolls is of prime importance in applying the Reed Attachment. Generally, all tooling operating from the cross slides on the machine is designed and positioned as close to the spindle carriage as possible. This will automatically position the cut-off tool in the most desirable position and minimize the total overhang of the work.

The same consideration should be given when applying the Reed Attachment. The type of thread rolls used will position the attachment relative to the spindle carriage.

The following procedure will be found helpful in arriving at the design of roll for use with the head (or heads) previously selected.

1. Position roll in relation to work.
2. Determine working face required.
3. Select type of roll to be used.
4. Check position of work in relation to collet face.

Position Roll in Relation to Work

Position one edge of the working face on the roll in relation to the threaded section on the work. The edge nearest the collet face will be considered the locating surface for developing the design of the roll.

Page 47 shows the position of the locating edge of the roll in relation to the work and is determined by the amount of bevel (or machine breakout) on the edge of the roll. It also includes minimum widths of cut-off tools permissible when rolling the thread at the cut-off end of the work.

Determine Working Face Required

After selecting the amount of bevel (or machine breakout) to be used on the roll for the application from Tables 22 and 23, compute the minimum working face required on the roll. Page 48 includes formulae for computing the minimum working face required on nonreversible rolls used for a single setting and the minimum working face required on reversible rolls used for two settings.

Select Type of Roll to be Used

After determining the minimum working face required, select the type of roll to be used. Table 21 gives dimensions of the standard rolls, rolls with the maximum extended working face, and reversible rolls.

There are basically eight conditions which determine the selection of type of thread rolls to be used:

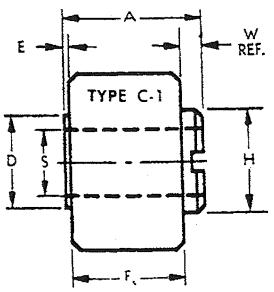
1. Thread size and length.
2. Cut-off end of work and width of cut-off tool.
3. Position of threaded section on work in relation to collet face.
4. Position of shoulders on work.
5. Requirements of threading close to shoulders.
6. Number of settings possible on the roll.
7. Material to be rolled.
8. Spindle speed.

Figs. 39 through 53 show various types of rolls that can be used and will help in selecting the correct roll for the application.

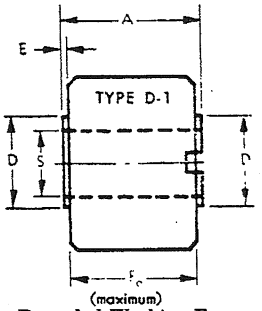
Important— There may be a definite advantage in applications where the machine spindle speed is comparatively high, to provide rolls with bronze bushings. These rolls should be used when the roll speed is more than **700-800** r.p.m. Roll speed can be computed by dividing the machine spindle speed by the number of starts on the rolls used.

Table 21 — Dimensions of Basic Rolls

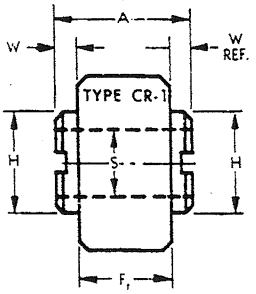
Thread Roll Head	Thread Roll Dimensions								
	A	D	E	F_s	F_e	F_r	H	W	S
B8	.580	.469	.010	.500	.560	.440	.565	.070	.313
B10	.780	.578	.015	.625	.750	.500	.672	.140	.375
B13	1.035	.773	.015	.875	1.000	.750	.860	.145	.531
B18	1.285	.900	.015	1.125	1.250	1.000	.993	.145	.625
B36	1.285	1.070	.015	1.125	1.250	1.000	1.184	.145	.812



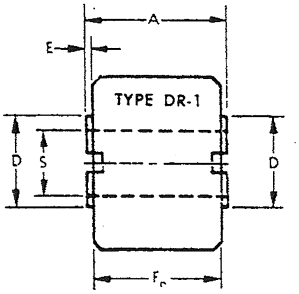
Standard Working Face



(maximum) Extended Working Face



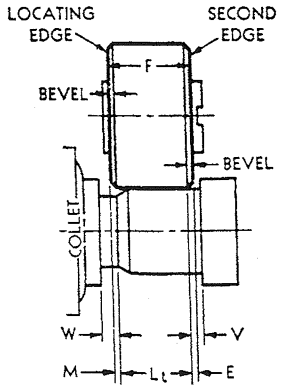
Standard Reversible Working Face



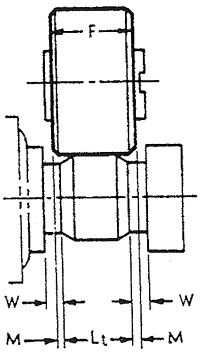
(maximum) Extended Reversible Working Face

Position of Thread Rolls in Relation to Work

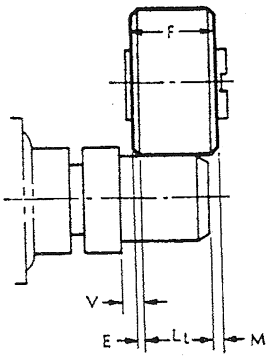
Determined by the amount of bevel (or machined breakouts) on the edge of the roll



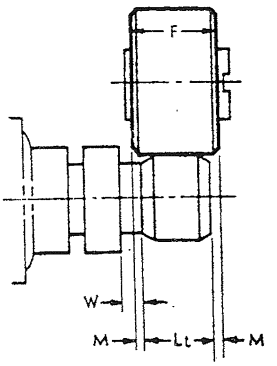
No. 1
Thread at cutoff end behind shoulder on straight blank



No. 2
Thread at cutoff end behind shoulder on blank with neck



No. 3
Thread in front of shoulder on straight blank



No. 4
Thread in front of shoulder on blank with neck

Note: For values of symbols above, refer Tables 22 and 23 next page.

Bevels on the roll edges are determined by W or V, and based on the minimum width of neck, cutoff tool or minimum distance from the shoulder to first complete thread. Sketches 1, 2, 3 and 4, above, show four basic application conditions to help determine the design of roll edge required.

W = Minimum width of cut-off tool or neck adjacent to shoulder permissible.

V = Minimum distance from shoulder to first complete thread on straight blanks.

M = Minimum distance from edge of roll to end of work.

E = Distance from roll edge to first complete thread.

L_t = Length of full thread on work.

*F = Working face on roll.

Formulae For Finding Minimum Working Face of Roll

Sketch No.	*Working Face of Roll	
	F_1	F_2
1	$M + L_t + E$	$2(E + L_t) + p$
2	$2M + L_t$	$2(M + L_t) + p$
3	$E + L_t + M$	$2(E + L_t) + p$
4	$2M + L_t$	$2(M + L_t) + p$

*F_1 = Minimum working face of non reversible rolls used for angle setting.
*F_2 = Minimum working face of reversible rolls used for two settings.
p = Pitch of thread.

Table 22 — Values at W, V, M and E

for 30°, 45°, and 60° Bevels and Machined Breakouts

Threads per Inch	†30° Bevel*				†45° Bevel*				‡60° Bevel*				§Machined Breakouts*			
	W	V	M	E	W	V	M	E	W	V	M	E	W	V	M	E
80	.023	.020	.017	.014	.018	.014	.011	.008	.014	.011	.008	.005				
72	.026	.023	.019	.016	.019	.016	.012	.009	.016	.012	.009	.005				
64	.029	.025	.021	.018	.022	.018	.014	.010	.018	.014	.010	.006				
56	.033	.029	.025	.020	.025	.021	.016	.012	.020	.016	.011	.007				
48	.039	.034	.029	.023	.029	.024	.019	.014	.024	.018	.013	.008				
44	.043	.037	.031	.026	.032	.026	.020	.015	.026	.020	.014	.009				
40	.047	.041	.034	.028	.035	.029	.022	.016	.028	.022	.016	.009				
36	.052	.045	.038	.031	.039	.032	.025	.018	.031	.024	.017	.010				
32	.059	.051	.043	.035	.044	.036	.028	.020	.035	.027	.020	.012				
28	.067	.058	.049	.040	.050	.041	.032	.023	.040	.031	.022	.013				
27	.069	.061	.051	.042	.052	.043	.033	.024	.042	.032	.023	.014				
24	.078	.068	.057	.047	.058	.048	.038	.027	.047	.036	.026	.016				
20	.094	.081	.069	.056	.070	.058	.045	.033	.056	.044	.031	.019	.056	.044	.031	.019
18	.104	.090	.076	.062	.078	.064	.050	.036	.063	.049	.035	.021	.063	.049	.035	.021
16	.117	.102	.086	.070	.088	.072	.056	.041	.070	.055	.039	.023	.070	.055	.039	.023
14	.134	.116	.098	.080	.100	.082	.064	.046	.080	.063	.045	.027	.080	.063	.045	.027
13	.144	.125	.106	.087	.108	.088	.069	.050	.087	.067	.048	.029	.087	.067	.048	.029
12	.156	.135	.115	.094	.117	.096	.078	.054	.094	.073	.052	.031	.094	.073	.052	.031
11½	.163	.141	.119	.098	.122	.100	.078	.056	.098	.076	.054	.033	.098	.076	.054	.033
11	.170	.148	.125	.102	.127	.105	.082	.059	.102	.080	.057	.034	.102	.080	.057	.034
10	.188	.163	.138	.113	.140	.115	.090	.065	.113	.088	.063	.038	.113	.088	.063	.038
9	.208	.181	.153	.125	.155	.128	.100	.072	.125	.097	.069	.042	.125	.097	.069	.042
8	.234	.203	.172	.141	.175	.144	.112	.081	.141	.109	.078	.047	.141	.109	.078	.047

Table 23 — Metric Value at W, V, M and E

for 30°, 45°, and 60° Bevels and Machined Breakouts

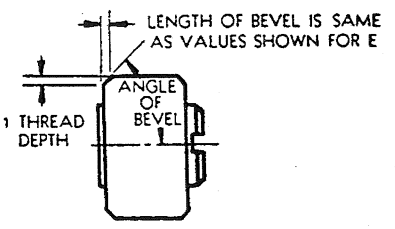
PITCH	30° BEVELS				45° BEVELS				60° BEVELS				§MACHINED BREAKOUTS			
(MM)	W	V	M	E	W	V	M	E	W	V	M	E	W	V	M	E
.35	.026	.022	.019	.016	.019	.016	.012	.009	.016	.012	.009	.005				
.40	.030	.026	.022	.018	.022	.018	.014	.010	.018	.014	.010	.006				
.45	.033	.029	.024	.020	.025	.020	.016	.012	.020	.016	.011	.007				
.50	.037	.032	.027	.022	.028	.023	.018	.013	.022	.017	.012	.007				
.60	.044	.038	.032	.027	.033	.027	.021	.015	.027	.021	.015	.009				
.70	.052	.045	.038	.031	.039	.032	.025	.018	.031	.024	.017	.010				
.75	.055	.048	.041	.033	.041	.034	.027	.019	.033	.026	.018	.011				
.80	.059	.051	.043	.035	.044	.036	.028	.020	.035	.028	.020	.012				
1.00	.074	.064	.054	.044	.055	.045	.035	.026	.044	.034	.025	.015				
1.25	.092	.080	.068	.055	.069	.057	.044	.032	.055	.043	.031	.018	.055	.043	.031	.018
1.50	.111	.096	.081	.066	.083	.069	.053	.038	.066	.052	.037	.022	.066	.052	.037	.022
1.75	.129	.112	.095	.078	.096	.079	.062	.045	.077	.060	.043	.026	.077	.060	.043	.026
2.00	.148	.128	.108	.088	.110	.091	.071	.051	.089	.069	.049	.029	.089	.069	.049	.029
2.50	.185	.160	.135	.111	.138	.113	.088	.064	.111	.086	.062	.037	.111	.086	.062	.037
3.00	.221	.192	.162	.133	.165	.136	.106	.077	.134	.103	.074	.044	.134	.103	.074	.044

§ Machined Breakouts not recommended for 24TPI or 1.0m.m. pitch and finer.

*Angle of bevels on the edges of the rolls is measured from the center line of the roll as shown.

†30° Bevels preferred on rolling edge.

‡60° Bevels may be used at the cut-off end when narrow cut-off tools are required.



24 T.P.I. and finer have 30° bevels, 23 T.P.I. and coarser have 45° bevels for single lead right hand threads.

Check Position of the Work in Relation to Collet Face

If the threaded section on the work is at the cut-off end, in most cases the position of the work in relation to the collet face will be determined by the position of the attachment.

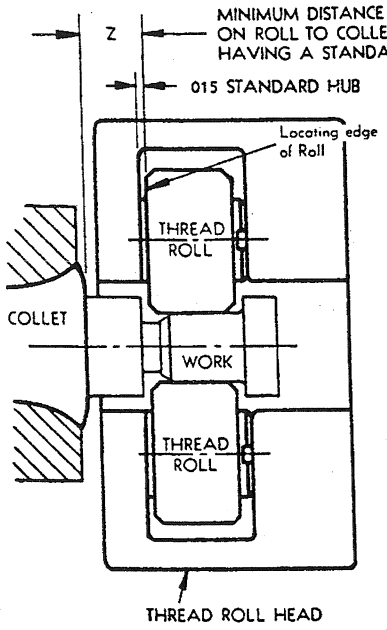
Table 24 gives the approximate minimum distance from the collet face to the locating edge of the roll permissible with each size head.

If other cross-slide tooling determines the position of the work and the threaded section on the work is away from the cut-off end, a check should be made for possible interference of the end working tools, tool holder or tool slide with the outboard side of the attachment.

Table 25 gives the physical dimensions of each size head for this purpose. If interference is evident, select a type of roll which will position the head on the side as close to the spindle carriage as possible.

Table 24 — Positioning of Head in Relation to Collet — Approximate

When Using Rolls Having Standard Plain Hubs*

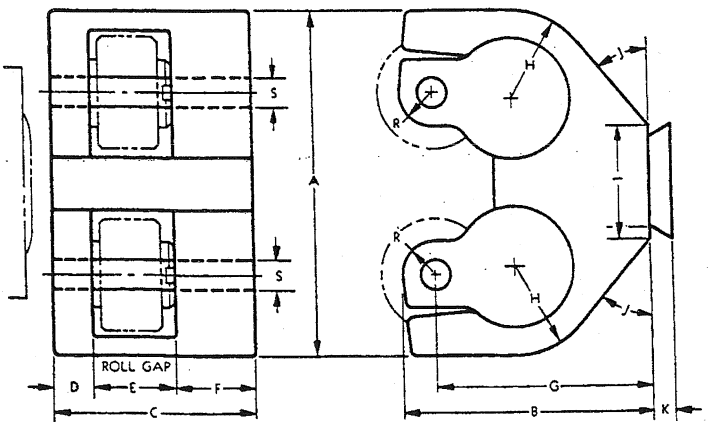


DISTANCE "Z"—Locating Edge of Roll to Collet Face

Threads per Inch	Thread Roll Head				
	B8	B10	B13	B18	B36
32	.310	.460	.580	.700	.900
28	.310	.460	.590	.710	.910
27	.310	.460	.590	.710	.910
24	.320	.470	.600	.720	.920
20	.330	.480	.610	.730	.930
18	.340	.490	.620	.740	.940
16	.350	.500	.630	.750	.950
14	.370	.520	.640	.760	.960
13	.380	.520	.650	.770	.970
12	.390	.530	.660	.780	.980
11½		...	...	...	.990
11		.540	.670	.790	.990
10		...	.680	.800	1.000
9		...	...	.820	1.020
8		...	...	.840	1.040

*When using rolls having hubs of special length, the distance from the locating edge of roll to collet face equals "Z" plus the length of the special hub minus .015

Table 25 — Dimensions of Thread Roll Heads



Head Dimensions Approx.	Thread Roll Head				
	B8	B10	B13	B18	B36
A	3	3 5/8	4 1/2	6 1/8	7 7/8
B	2 1/32	2 19/32	3 1/4	3 7/8	4 21/32
C	1 7/16	1 31/32	2 9/16	3 3/32	3 1/2
D	1/4	3/8	1/2	5/8	13/16
E	19/32	25/32	1 1/16	1 5/16	1 5/16
F	19/32	25/32	1 1/16	1 3/16	1 3/8
G	1 11/16	2 9/32	2 27/32	3 3/8	4
H	3/4	29/32	1 5/32	1 3/4	2 3/4
I	1	1 1/2	1 1/2	2	2 3/4
J	45°	40°	40°	33°	30°
K	3/16	3/8	9/32	3/8	17/32
R	9/32	11/32	7/16	1/2	19/32
S	9/16	3/8	17/32	5/8	13/16

Final Selection of the Attachment

The final selection of the attachment best suited for the application can now be made. Give preference to the largest size of attachment applicable to the machine which will provide for maximum thread diameter and shoulder clearance capacity. Also the size of attachment providing the capacity that may be required for future applications should be considered as well as the size which may be used to the greatest advantage on the positions of machines available.

TYPICAL APPLICATIONS OF THREAD ROLLS

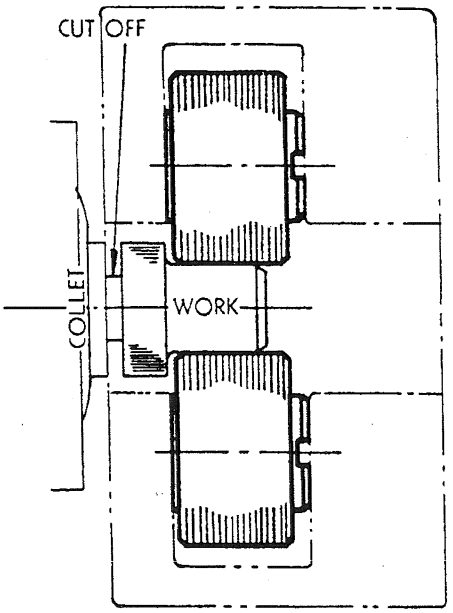


FIG. 39

Type C-1 Roll

These rolls with standard hubs, are generally used for rolling on the outboard end of the work as shown, or where the standard working face of the roll is satisfactory for the length of thread to be rolled, and the position of the attachment relative to the collet face is unimportant.

All other types of rolls are modifications of this design.

Type C-2 Roll

These rolls, with a narrow working face, are generally used for rolling the thread at the cut-off end behind a shoulder.

With the working face at the plain hub end, it permits positioning the cut-off end of work close to the collet face.

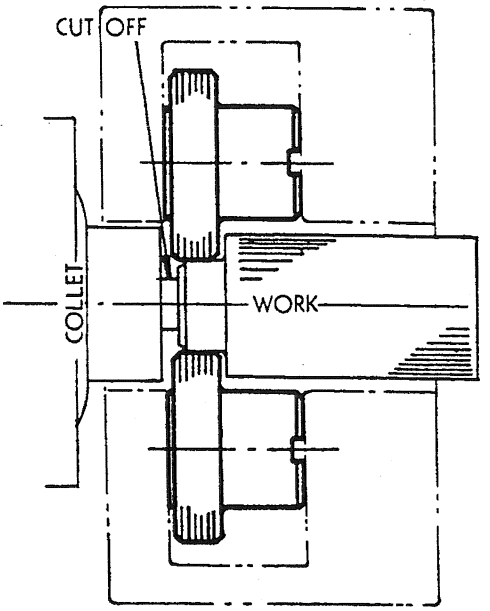


FIG. 40

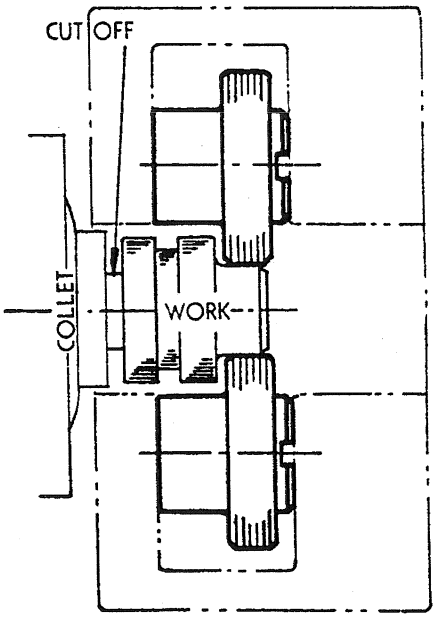


FIG. 41

Type C-3 Roll

These rolls are used when the threaded section on the work is away from the cut-off end and where it is desirable to position the attachment on the cross slide close to the spindle carriage.

The roll design includes a narrow working face, retaining the standard drive hub for ease of assembly in the head.

TYPICAL APPLICATIONS OF THREAD ROLLS (Continued)

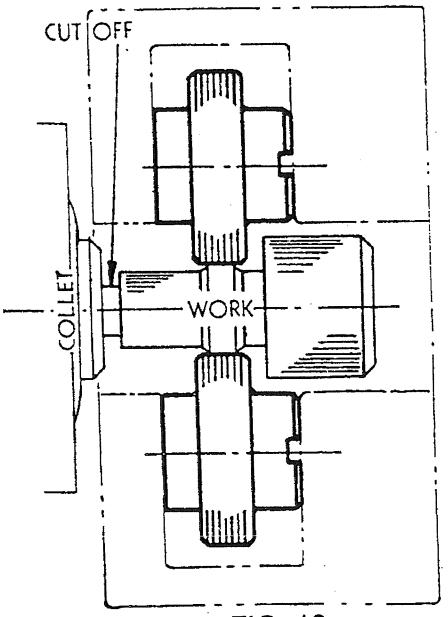


FIG. 42

Type C-4 Roll

These rolls, with a narrow working face, are normally centered, but can be positioned off center. They are used when attachment positioning on the cross slide is important as well as the position of the cut-off end of the work in relation to the collet face.

On the application shown, the narrow working face on the roll is required to prevent contact of the roll with the finished diameter between the threaded section on the roll and the cut-off end.

Type C-5 Roll

Two sections with threads of the same diameter and pitch can be rolled with rolls of this design.

The rolls are relieved to provide clearance for the shoulders on the work.

The combined length of the threaded and center sections is within the standard total working face of a roll with a standard drive hub.

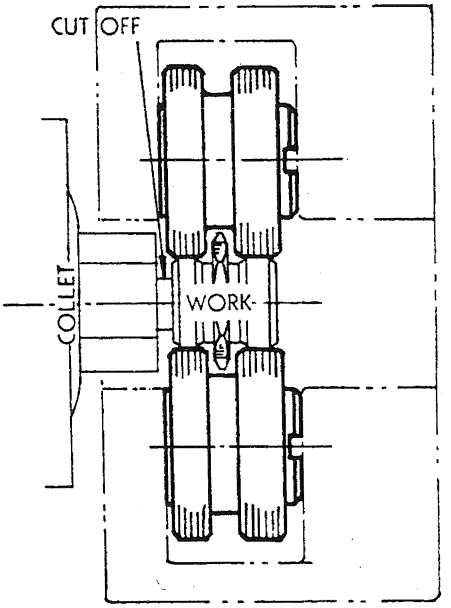


FIG. 43

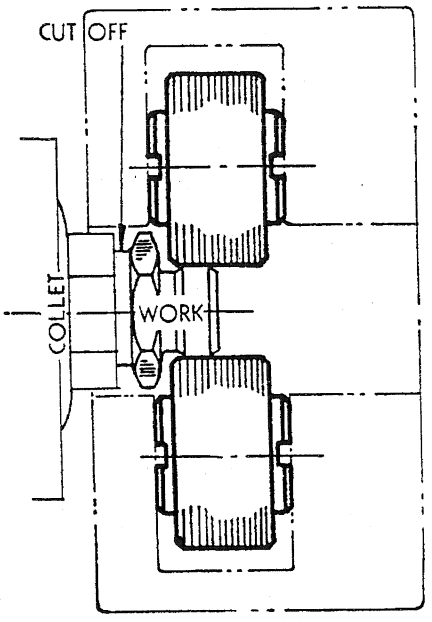


FIG. 44

Type CR-1 Roll

When thread length permits, reversible rolls of this design can be used and provide for two settings of the roll.

The design includes two standard drive hubs for ease of assembly in the head. The rolls can be reversed without repositioning the attachment or other cross-slide tooling.

TYPICAL APPLICATIONS OF THREAD ROLLS (Continued)

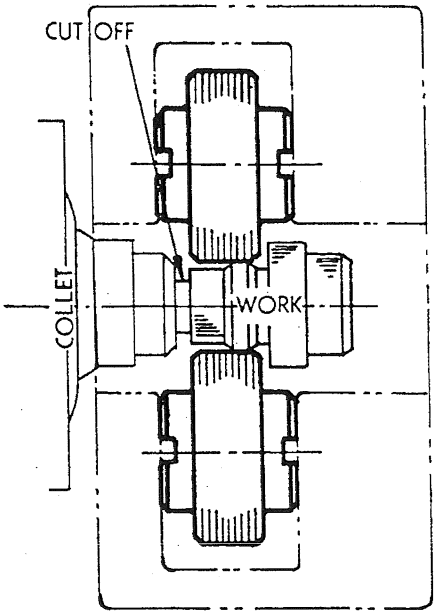


FIG. 45

Type CR-4 Roll

These reversible rolls are designed with a centralized narrow working face providing two settings of the roll on work having a short length of thread.

Limitations of space between a shoulder and the cut-off tool and exact positioning of the work from the collet face, require rolls of this design.

The rolls can be reversed without repositioning the attachment or other cross-slide tooling.

Type CR-5 Roll

Reversible rolls of this design are used to provide two settings of the roll on work having a short thread length adjacent to a shoulder.

The combined lengths of the threaded and center sections must be within the total working face of a roll with two standard drive hubs.

The rolls can be reversed without repositioning the attachment or other cross-slide tooling.

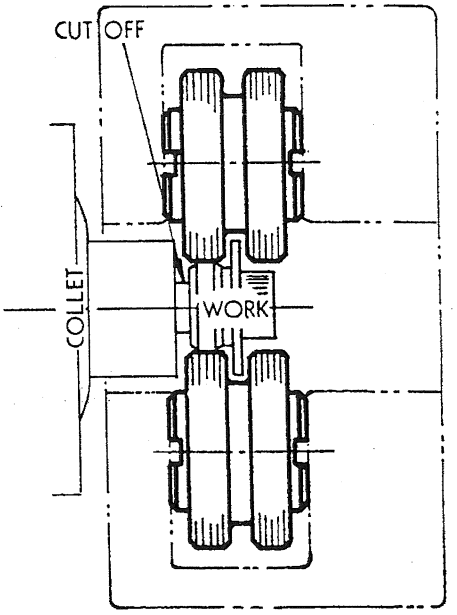


FIG. 46

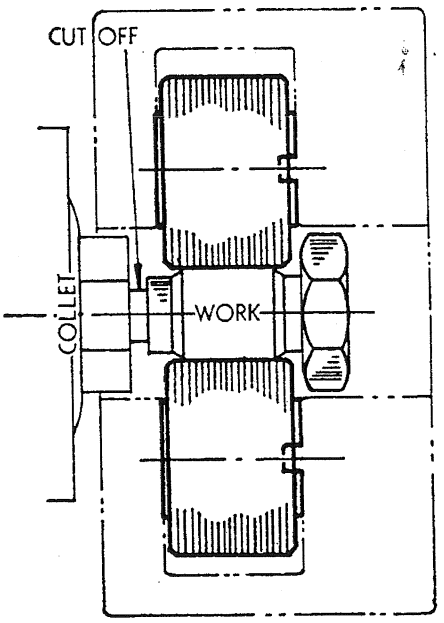


FIG. 47

Type D-1 Roll

When the working face of rolls with standard hubs is not sufficient for the required thread length on the work, additional thread length capacity can be provided with rolls of this design.

It includes an extended working face, two standard plain hubs and a recessed drive slot.

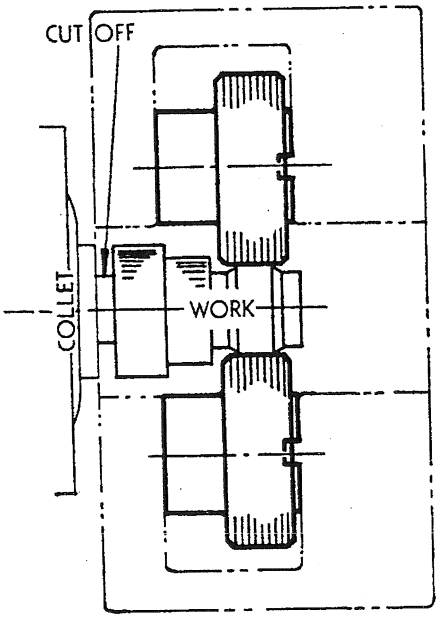


FIG. 48

Type D-3 Roll

This design of roll is a further modification of a type C-3 roll and is used when cross-slide design makes it necessary for the attachment to be positioned as close to the spindle carriage as possible.

The positioning of the attachment, close to the spindle carriage, is also desirable in some cases to eliminate possible interference of the end working tools, tool holders or tool slide with the attachment.

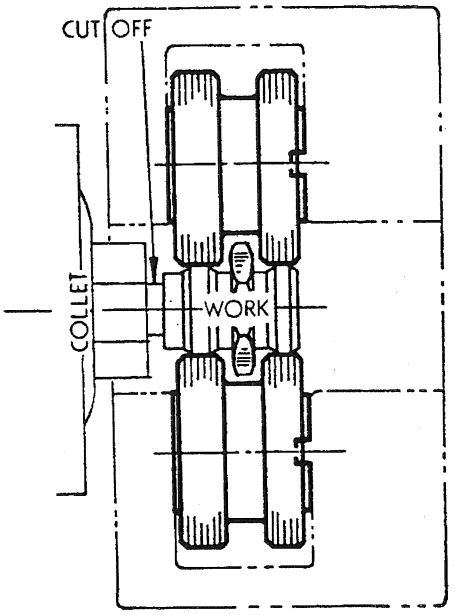


FIG. 49

Type D-5 Roll

These rolls are a further modification of a type C-5 roll, providing additional thread length capacity.

This is necessary when the combined lengths of the threaded and center sections on the work exceed the total working face available on rolls having a standard drive hub.

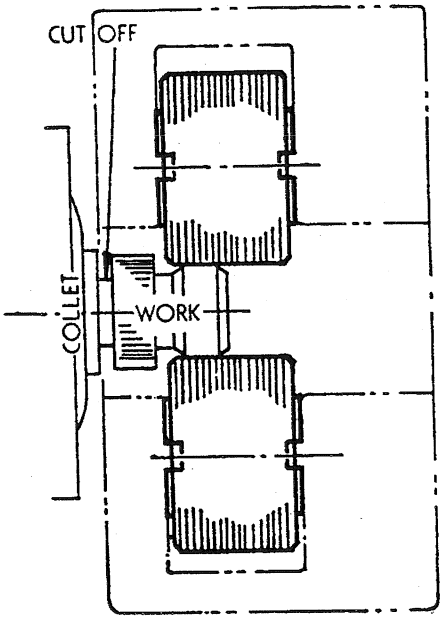


FIG. 50

Type DR-1 Roll

These are reversible rolls designed with an extended working face and recessed drive slots at both ends for two-roll settings.

They are a modification of a type CR-1 roll, providing additional thread length capacity.

The rolls can be reversed without repositioning the attachment or other cross-slide tooling.

TYPICAL APPLICATIONS OF THREAD ROLLS (Continued)

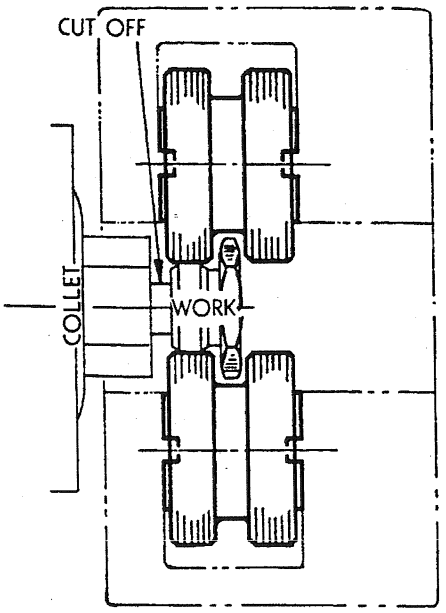


FIG. 51

Type DR-5 Roll

This design of roll includes an extended total working face with recessed drive slots, providing two settings of the roll on work having a short thread length adjacent to a shoulder.

It is a modification of a type CR-5 roll, with additional thread length capacity.

The rolls can be reversed without repositioning the attachment or other cross-slide tooling.

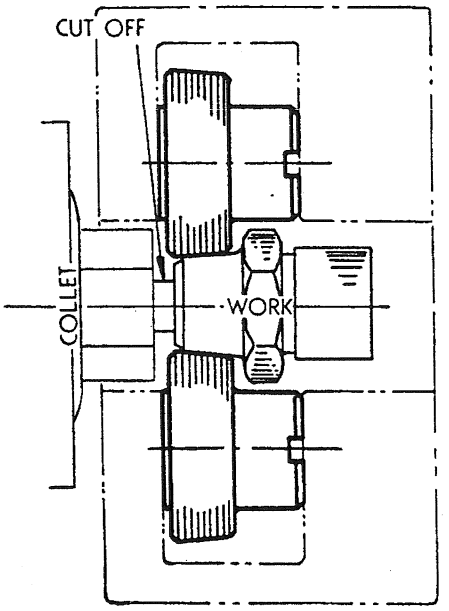


FIG. 52

Type K-2 Roll

These rolls are designed for rolling taper pipe threads when the small end of the taper on the work is towards the collet.

The length of working face is determined by the requirements of the work.

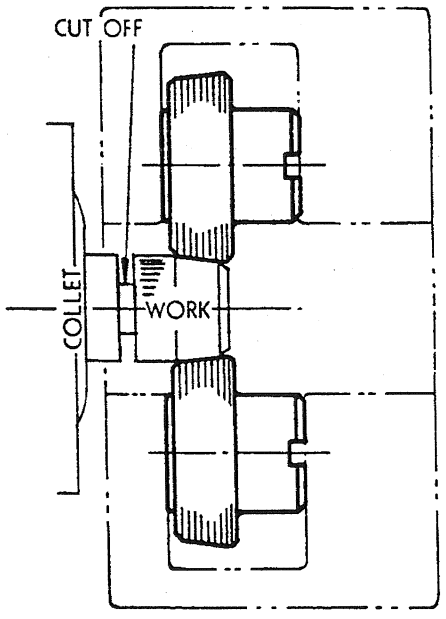


FIG.53

Type Q-2 Roll

These rolls are designed for rolling taper pipe threads when the large end of the taper on the work is towards the collet.

The length of working face is determined by the requirements of the work.

WORK REVOLUTIONS AND FEEDS

The continual change of relation of diameters between the thread roll and the work during the rolling cycle results in a side or axial motion of the rolls and is directly affected by the total work revolutions. This motion, if not controlled, will create undesirable side pressures and may affect the operation of the attachment considerably.

Table 26 gives the suggested work revolutions for each head size, based on threads per inch.

In most cases it is necessary to know the feed per revolution of the work in order to design or select the proper cam for thread rolling. The following formula can be used for converting the values of work revolutions given in Table 26 to feed per revolution:

$$F = \frac{M}{R}$$

where F = cross-slide feed per revolution of the work

M = thread roll advance (refer to Table 27 on page 57 and Tables 28, 29 and 30 on pages 59 thru 63.

R = suggested number of work revolutions for rolling (from Table 26)

For Example: Determine the feed per revolution when rolling a 5/8-18 UNF thread with a B13 attachment on B-1113 steel of a Rockwell hardness of C13. The advance from Table 28 on page 59 is .170 and the suggested average work revolutions from Table 26, is 17.

$$F = \frac{.170}{17} = .010 \text{ feed per revolution}$$

Table 26 — Suggested Work Revolutions for Rolling
with the Reed Thread Rolling Attachments — Series B

THREADS PER INCH	ATTACHMENT SIZE														
	B8			B10			B13			B18			B36		
	BRASS OR ALUM.	CARBON OR ALLOY STEEL UP TO ROCKWELL C15	CARBON OR ALLOY STEEL ROCKWELL C16-20 OR STAINLESS	BRASS OR ALUM.	CARBON OR ALLOY STEEL UP TO ROCKWELL C15	CARBON OR ALLOY STEEL ROCKWELL C16-20 OR STAINLESS	BRASS OR ALUM.	CARBON OR ALLOY STEEL UP TO ROCKWELL C15	CARBON OR ALLOY STEEL ROCKWELL C16-20 OR STAINLESS	BRASS OR ALUM.	CARBON OR ALLOY STEEL UP TO ROCKWELL C15	CARBON OR ALLOY STEEL ROCKWELL C16-20 OR STAINLESS	BRASS OR ALUM.	CARBON OR ALLOY STEEL UP TO ROCKWELL C15	CARBON OR ALLOY STEEL ROCKWELL C16-20 OR STAINLESS
56	*8-10	*9-11	*11-12												
48	*8-10	*9-11	*11-12												
44	*9-11	*10-12	*12-14												
40	*9-11	*10-12	*12-14												
36	*10-12	*11-13	13-15												
32	*10-12	*11-13	13-15	*10-12	*11-13	14-16	*10-12	*12-14	15-17	12-14	14-16	17-19	13-15	16-18	20-23
28	*10-12	*11-13	13-15	*10-12	*12-14	15-17	*11-13	14-16	16-18	13-15	15-17	18-20	14-16	17-19	22-25
27	*11-13	*12-14	14-16	*10-12	*12-14	15-17	*11-13	14-16	17-19	13-15	16-18	19-21	14-16	17-19	22-25
24	*11-13	12-14	14-16	*11-13	*13-15	16-18	*12-14	15-17	18-20	14-16	17-19	20-23	14-17	18-21	23-26
20	12-14	13-15	16-18	*12-14	14-16	18-20	*13-15	16-18	19-21	15-17	18-20	21-24	15-18	19-22	24-27
18	12-14	13-15	16-18	12-14	15-17	18-20	13-15	16-18	20-22	16-18	18-21	22-25	16-19	20-23	25-28
16	12-14	13-15	16-18	13-15	16-18	19-21	14-16	17-19	21-23	16-19	19-22	23-26	17-20	21-24	26-29
14	13-15	14-16	17-19	13-15	16-18	20-22	15-17	18-20	22-24	16-19	20-23	23-27	18-21	22-25	26-30
13	14-16	15-17	18-20	14-16	17-19	21-23	15-18	18-21	22-25	17-20	21-24	24-28	19-22	23-26	27-31
12	15-17	15-17	19-21	15-17	18-20	....	16-19	19-22	23-26	18-21	22-25	25-29	20-23	24-27	28-33
11½				....	....	....	....	....	....	....	....	....	20-23	24-27	28-33
11				16-18	....	....	17-20	21-24	25-28	19-22	23-26	26-30	21-24	24-28	29-34
10				....	....	....	18-21	22-25	26-29	20-23	24-27	27-31	21-25	25-29	30-35
9				....	....	....	....	....	....	21-24	25-28	28-32	22-26	26-30	31-36
8				....	....	....	....	....	....	21-25	25-29	29-33	23-27	27-31	32-37

*For diameters less than 1/4" use from 14 to 20 work revolutions.

THREAD ROLL ADVANCEMENT

Thread Roll Advance "M" is the distance between initial contact of the thread rolls with the work to full rolling position on the center line of the work.

Table 27 on page 57 and Tables 28, 29 and 30 on pages 59 thru 63 give the thread roll advance for Unified and American External Screw Threads and American Standard External Pipe Threads. The thread roll advance for any thread size not covered by these tables may be determined by either the graph on page 58 or formula below.

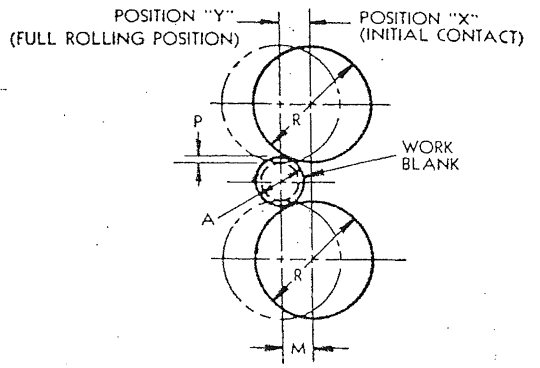


FIG. 54

Formula for Finding Thread Roll Advance

$$M = \sqrt{P \times A \times (N+1)}$$

where

M = Thread Roll Advance
P = Total Depth of Penetration of Roll in the Work Blank — usually equal to the dedendum of the thread
A = Diameter of the Work Blank
N = Number of Starts on the Roll

Table 27 — Thread Roll Advancement

for American Standard External Taper Pipe Threads

N—Number of Starts on Thread Roll.
M—Maximum Roll Advance.

Pipe Size		Thread Roll Heads				
		B8	B10	B13	B18	B36
1/16–27	N	4	4	5	7	
	M	.130	.130	.140	.160	
1/8–27	N	3	3	4	5	
	M	.130	.130	.150	.160	
1/4–18	N	2	2	3	4	5
	M	.160	.160	.190	.210	.230
3/8–18	N			2	3	4
	M		.180	.180	.210	.240
1/2–14	N			2	2	3
	M			.230	.230	.270
3/4–14	N				2	2
	M				.260	.260
1–11 1/2	N					2
	M					.320
1 1/4–11 1/2	N					1
	M					.300
1 1/2–11 1/2	N					1
	M					.320

Graph for Finding Thread Roll Advance

How to Use the Thread Roll Advance Graph

*C = (R + A)—2P

where:

C = Roll Center Distance
R = Outside Diameter of the Thread Roll
A = Diameter of the Work Blank
P = Total Depth of Penetration of Roll in the Work Blank — usually equal to the dedendum of the thread.

Example:

Determine the Thread Roll Advance when the roll center distance (computed) is 1.500 and the total depth of penetration is .024. Connect a straight line from a reading of 1.500 in column "C" to a reading of .024 on column "P" and read the Thread Roll Advance on column "M" which is .190.

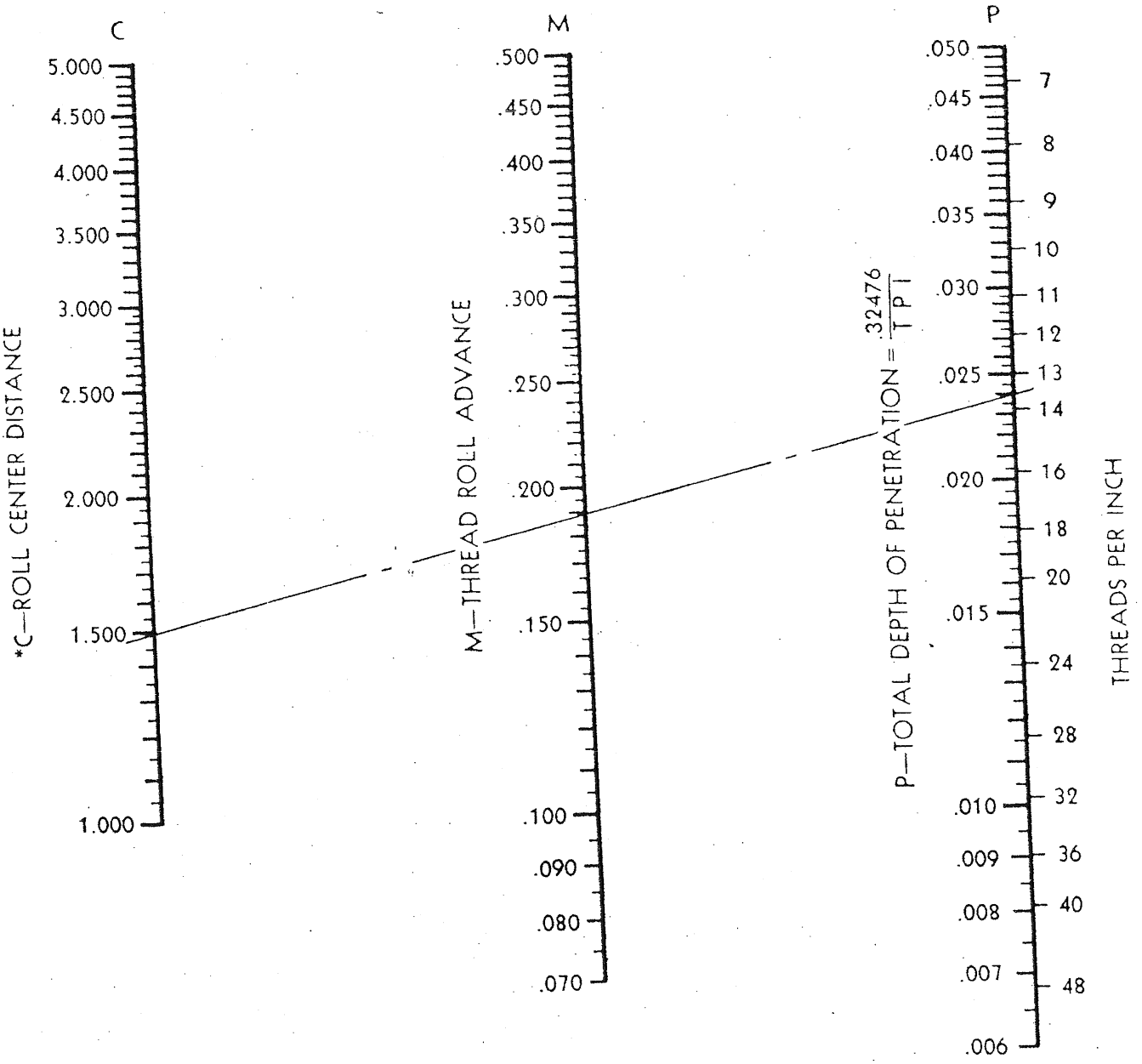


Table 28 — Thread Roll Advancement Chart

for Unified External Screw Threads

N—Number of Starts on Thread Roll

M—Maximum Roll Advance

THREAD SIZE			THREAD ROLL HEADS				
DIAM.	THDS. PER INCH		B8	B10	B13	B18	B36
2	56	N	15	18			
		M	.080	.090			
	64	N	15	18			
		M	.070	.080			
3	48	N	13	15			
		M	.080	.090			
	56	N	13	16			
		M	.080	.090			
4	40	N	12	15			
		M	.090	.110			
	48	N	11	14			
		M	.090	.090			
5	40	N	10	13	15		
		M	.090	.110	.110		
	44	N	10	12	15		
		M	.090	.100	.110		
6	32	N	10	12	14		
		M	.113	.120	.130		
	40	N	8	11	13		
		M	.113	.100	.110		
8	32	N	7	9	11		
		M	.100	.120	.130		
	36	N	7	9	11		
		M	.090	.110	.120		
10	24	N	7	8	10		
		M	.131	.140	.150		
	28	N	6	8	10		
		M	.110	.130	.140		
	32	N	6	8	10		
		M	.100	.120	.130		
	36	N	6	8	9		
		M	.100	.110	.120		
	40	N	6	7	9		
		M	.090	.100	.110		
	48	N	6	7	9		
		M	.090	.090	.110		
	56	N	6	7	9		
		M	.080	.090	.100		
12	24	N	6	7	9		
		M	.132	.140	.150		
	28	N	5	7	8		
		M	.110	.130	.140		
	32	N	5	7	8		
		M	.110	.120	.130		
	36	N	5	6	8		
		M	.110	.110	.120		
	40	N	5	6	8		
		M	.090	.100	.120		
	48	N	5	6	8		
		M	.080	.100	.110		
	56	N	5	6	8		
		M	.080	.090	.100		
1/4	20	N	5	6	8	9	
		M	.140	.150	.170	.180	
	24	N	5	6	7	9	
		M	.130	.140	.150	.170	
	28	N	5	6	7	9	
		M	.125	.130	.140	.160	
	32	N	4	6	7	9	
		M	.100	.120	.130	.150	
	36	N	4	5	7	8	
		M	.090	.110	.120	.130	
	40	N	4	5	7	8	
		M	.090	.100	.120	.130	
	48	N	4	5	7	8	
		M	.080	.100	.110	.120	
	56	N	5	5	6	8	
		M	.080	.090	.100	.110	
5/16	18	N	4	5	6	7	
		M	.150	.170	.180	.190	
	20	N	4	5	6	7	
		M	.140	.160	.170	.180	

THREAD SIZE			THREAD ROLL HEADS				
DIAM.	THDS. PER INCH		B8	B10	B13	B18	B36
5/16	24	N	3	4	6	7	
		M	.120	.130	.160	.170	
	28	N	3	4	5	7	
		M	.110	.130	.140	.160	
	32	N	3	4	5	7	
		M	.100	.120	.130	.153	
	36	N	3	4	5	7	
		M	.100	.110	.120	.145	
	40	N	3	4	5	7	
		M	.090	.110	.120	.138	
	48	N	3	4	5	7	
		M	.080	.100	.110	.126	
3/8	16	N	3	4	5	6	8
		M	.150	.180	.190	.210	.230
	18	N	3	4	5	6	8
		M	.150	.170	.180	.200	.220
	20	N	3	4	5	6	8
		M	.140	.160	.170	.190	.210
	24	N	3	4	4	6	7
		M	.130	.150	.150	.180	.180
	28	N	3	3	4	6	7
		M	.120	.120	.140	.168	.170
	32	N	3	3	4	5	7
		M	.110	.120	.130	.140	.160
	36	N	3	3	4	5	7
		M	.110	.110	.120	.130	.150
	40	N	3	3	4	5	7
		M	.100	.110	.110	.120	.150
7/16	14	N	2	3	4	5	7
		M	.150	.180	.200	.220	.260
	16	N	2	3	4	5	7
		M	.150	.170	.190	.210	.240
	18	N	2	3	4	5	6
		M	.140	.160	.180	.200	.210
	20	N	2	3	4	5	6
		M	.130	.160	.180	.190	.210
	24	N	2	3	4	5	6
		M	.120	.140	.160	.181	.190
	28	N	2	3	4	5	6
		M	.110	.140	.150	.169	.180
	32	N	2	3	3	5	7
		M	.110	.130	.130	.158	.170
1/2	12	N	2	3	3	4	6
		M	.180	.210	.210	.240	.280
	13	N	2	3	3	4	6
		M	.170	.200	.200	.230	.270
	14	N	2	3	3	4	6
		M	.170	.200	.200	.220	.260
	16	N	2	3	3	4	6
		M	.160	.192	.190	.210	.250
	18	N	2	3	3	4	6
		M	.150	.182	.180	.200	.240
	20	N	2	3	3	4	5
		M	.140	.173	.170	.190	.210
	24	N	2	2	3	4	5
		M	.130	.130	.160	.170	.190
	28	N	2	2	3	4	5
		M	.120	.130	.150	.160	.180
	32	N	2	2	3	4	5
		M	.110	.120	.140	.150	.170
9/16	12	N		2	3	4	5
		M		.200	.230	.250	.280
	14	N		2	3	4	5
		M		.180	.210	.243	.260
	16	N		2	3	4	5
		M		.170	.200	.229	.250
	18	N		2	3	4	5
		M		.160	.190	.217	.230
	20	N		2	3	4	5
		M		.160	.180	.206	.220
	24	N		2	3	4	5
		M		.140	.170	.189	.200

THREAD SIZE			THREAD ROLL HEADS			
DIAM.	THDS. PER INCH		B10	B13	B18	B36
9/16	28	N	2	3	4	5
		M	.130	.150	.176	.190
	32	N	2	3	3	5
		M	.120	.140	.140	.180
5/8	11	N	2	3	3	5
		M	.220	.250	.250	.315
	12	N	2	2	3	4
		M	.210	.210	.240	.270
	14	N	2	2	3	4
		M	.190	.190	.220	.250
	16	N	2	2	3	4
		M	.180	.180	.210	.240
	18	N	2	2	3	4
		M	.170	.170	.200	.220
	20	N	2	2	3	4
		M	.160	.160	.190	.210
	24	N	2	2	3	4
		M	.150	.150	.180	.200
	28	N	2	2	3	4
		M	.140	.140	.160	.180
	32	N	2	2	3	4
		M	.130	.130	.150	.170
11/16	12	N		2	3	4
		M		.220	.250	.280
	24	N		2	3	4
		M		.160	.190	.210
3/4	10	N		2	3	4
		M		.250	.290	.310
	12	N		2	3	4
		M		.230	.273	.300
	14	N		2	3	3
		M		.220	.254	.250
	16	N		2	3	3
		M		.200	.239	.240
	18	N		2	3	3
		M		.190	.226	.220
	20	N		2	3	3
		M		.180	.215	.210
	24	N		2	3	3
		M		.170	.197	.190
	28	N		2	3	3
		M		.160	.183	.180
	32	N		2	3	3
		M		.150	.171	.170
13/16	12	N		2	2	3
		M		.210	.240	.280
	16	N		2	2	3
		M		.210	.210	.250
	20	N		2	2	3
		M		.190	.190	.220
7/8	9	N			2	3
		M			.290	.330
	10	N			2	3
		M			.270	.320
	12	N			2	3
		M			.250	.290
	14	N			2	3
		M			.240	.270
	16	N			2	3
		M			.220	.260
	18	N			2	3
		M			.210	.240
	20	N			2	3
		M			.200	.230
	24	N			2	3
		M			.180	.210
	28	N			2	3
		M			.170	.200
	32	N			2	3
		M			.160	.180

Table 28 — Thread Roll Advancement Chart (Continued)

for Unified External Screw Threads

N—Number of Starts on Thread Roll M—Maximum Roll Advance

THREAD SIZE			THREAD ROLL HEADS			
DIAM.	THDS. PER INCH		B10	B13	B18	B36
15/16	12	N			2	3
		M			.260	.300
	16	N			2	3
		M			.230	.260
	20	N			2	3
		M			.210	.240
1	8	N			2	3
		M			.330	.380
	10	N			2	3
		M			.300	.347
	12	N			2	2
		M			.270	.270
	14	N			2	2
		M			.250	.250
	16	N			2	2
		M			.240	.240
	18	N			2	2
		M			.240	.240
	20	N			2	2
		M			.210	.210
	24	N		1	2	2
		M		.160	.200	.200
	28	N		1	2	2
		M		.150	.180	.180
	32	N		1	2	2
		M		.140	.170	.170
1-1/16	12	N			2	2
		M			.280	.280
	16	N		1	2	2
		M		.200	.250	.250
	18	N		1	2	2
		M		.190	.230	.230
1-1/8	8	N			2	2
		M			.350	.350
	10	N			2	2
		M			.310	.310
	12	N			2	2
		M			.290	.290
	14	N			2	2
		M			.270	.270
	16	N		1	2	2
		M		.210	.250	.250
	18	N		1	2	2
		M		.190	.240	.240
	20	N		1	2	2
		M		.190	.230	.230
	24	N		1	2	2
		M		.170	.210	.210
	28	N		1	1	2
		M		.160	.160	.190
1-3/16	12	N				2
		M				.300
	16	N		1	1	2
		M		.210	.210	.260
	18	N		1	1	2
		M		.200	.200	.250
1-1/4	8	N				2
		M				.370
	10	N			1	2
		M			.270	.330
	12	N			1	2
		M			.250	.310
	14	N			1	2
		M			.230	.290
	16	N			1	2
		M			.220	.270
	18	N			1	2
		M			.210	.250
	20	N			1	2
		M			.200	.240

THREAD SIZE			THREAD ROLL HEADS			
DIAM.	INCH		B10	B13	B18	B36
1-1/4	24	N			1	2
		M			.180	.220
1-5/16	12	N			1	2
		M			.260	.310
	16	N			1	2
		M			.220	.270
	18	N			1	2
		M			.210	.260
1-3/8	8	N				2
		M				.390
	10	N			1	2
		M			.290	.350
	12	N			1	2
		M			.260	.320
	14	N			1	2
		M			.240	.300
	16	N			1	2
		M			.230	.280
	18	N			1	2
		M			.220	.260
	20	N			1	2
		M			.210	.250
	24	N			1	2
		M			.190	.240
1-7/16	12	N			1	2
		M			.270	.334
	16	N			1	1
		M			.240	.240
	18	N			1	1
		M			.220	.220
1-1/2	8	N				1
		M				.330
	10	N			1	1
		M			.300	.300
	12	N			1	1
		M			.280	.280
	14	N			1	1
		M			.260	.260
	16	N			1	1
		M			.240	.240
	18	N			1	1
		M			.230	.230
	20	N			1	1
		M			.220	.220
	24	N			1	1
		M			.200	.200
1-9/16	16	N			1	1
		M			.250	.250
	18	N			1	1
		M			.230	.230
1-5/8	8	N				1
		M				.350
	10	N				1
		M				.310
	12	N			1	1
		M			.290	.290
	14	N			1	1
		M			.270	.270
	16	N			1	1
		M			.250	.250
	18	N			1	1
		M			.240	.240
	20	N			1	1
		M			.220	.220
	24	N			1	1
		M			.200	.200
1-11/16	16	N				1
		M				.260
	18	N				1
		M				.240

THREAD SIZE			THREAD ROLL HEADS			
DIAM.	THDS. PER INCH		B10	B13	B18	B36
1-3/4	8	N				1
		M				.360
	10	N				1
		M				.330
	12	N				1
		M				.290
	14	N				1
		M				.280
	16	N				1
		M				.260
	18	N				1
		M				.240
	20	N				1
		M				.230
1-13/16	16	N				1
		M				.260
1-7/8	8	N				1
		M				.370
	10	N				1
		M				.340
	12	N				1
		M				.310
	14	N				1
		M				.290
	16	N				1
		M				.270
	18	N				1
		M				.250
	20	N				1
		M				.240
1-15/16	16	N				1
		M				.270
	10	N				1
		M				.350
	12	N				1
		M				.320
	14	N				1
		M				.300
	16	N				1
		M				.280
	16	N				1
		M				.280
	18	N				1
		M				.260
	20	N				1
		M				.250
2-1/16	16	N				1
		M				.280
2-1/8	8	N				1
		M				.400
	12	N				1
		M				.330
	16	N				1
		M				.290
2-3/16	16	N				1
		M				.290
2-1/4	8	N				1
		M				.410
	10	N				1
		M				.370
	12	N				1
		M				.340
	14	N				1
		M				.310
	16	N				1
		M				.290
	18	N				1
		M				.280
	20	N				1
		M				.260

Table 29 — Thread Roll Advance Chart

Metric Thread Sizes

M — Max. Roll Adv N — Number of Starts on Thread Roll

THREAD SIZE			THREAD ROLL HEADS					
Diam.	Pitch		B5	B8	B10	B13	B18	B36
M1.8	0.35	N B	16 .068	18 .072				
M2.0	0.4	N B	15 .074	16 .076				
M2.2	0.45	N B	13 .077	15 .082	18 .090			
M2.5	0.45	N B	11 .077	13 .083	15 .089			
M3.0	0.50	N B	9 .081	10 .085	13 .096	15 .103		
M3.5	0.60	N B	8 .091	9 .096	11 .105	13 .114		
M4.0	0.70	N B	7 .099	8 .105	9 .111	12 .127		
M4.5	0.75	N B	6 .102	7 .109	8 .116	10 .128		
M5.0	0.80	N B	5 .103	6 .112	7 .119	9 .134		
M6.0	1.00	N B	4 .115	5 .126	6 .137	8 .155		
M7.0	1.00	N B	3 .113	4 .126	5 .138	6 .149	8 .169	
M8.0	1.00	N B	3 .121	3 .121	4 .135	5 .148	7 .171	9 .192
M8.0	1.25	N B	3 .134	4 .150	4 .149	6 .177	7 .189	
M10	1.00	N B		3 .137	3 .137	4 .153	5 .168	7 .193
M10	1.25	N B		3 .151	3 .151	4 .169	5 .186	7 .214
M10	1.50	N B		3 .164	3 .164	4 .184	6 .218	7 .233
M12	1.25	N B		2 .145	3 .167	3 .167	4 .187	6 .221
M12	1.75	N B		2 .169	3 .195	3 .195	5 .239	6 .258
M14	1.50	N B			2 .171	3 .198	4 .221	5 .242
M14	2.00	N B			2 .195	3 .225	4 .252	5 .276
M16	1.50	N B			2 .184	2 .184	3 .213	4 .238

For thread sizes not shown within capacity of attachment refer to factory.

Table 29 — Thread Roll Advance Chart (Continued)

Metric Thread Sizes

M — Max. Roll Adv N — Number of Starts on Thread Roll

THREAD SIZE			THREAD ROLL HEADS					
Diam.	Pitch		B5	B8	B10	B13	B18	B36
M16	2.00	N B			2 .210	2 .210	3 .243	4 .271
M18	1.50	N B				2 .196	3 .226	4 .253
M18	2.50	N B				2 .248	3 .286	4 .320
M20	1.50	N B				2 .207	2 .207	3 .239
M20	2.50	N B				2 .263	3 .303	3 .303
M22	1.50	N B					2 .218	3 .252
M22	2.50	N B					2 .277	3 .320
M24	2.00	N B					2 .261	3 .302
M24	3.00	N B					2 .215	3 .364
M27	2.00	N B					2 .278	2 .278
M27	3.00	N B					2 .336	2 .336
M30	2.00	N B					1 .240	2 .294
M30	3.50	N B						2 .382
M33	2.00	N B					1 .252	2 .309
M33	3.50	N B						2 .402
M36	3.00	N B					1 .320	2 .392
M36	4.00	N B						2 .448
M39	3.00	N B					1 .334	1 .334
M39	4.00	N B						
M42	4.50	N B						1 .420

For thread sizes not shown within capacity of attachment refer to factory.

Table 30 — Thread Roll Advancement Chart

for American Standard External Straight Pipe Threads

N—Number of Starts on Thread Roll M—Maximum Roll Advance

PIPE SIZE		THREAD ROLL HEADS													
		NPSL					NPSM				NPSH			NH	
		B8	B10	B13	B18	B36	B10	B13	B18	B36	B13	B18	B36	B18	B36
1/8-27	N	3	3	4	5	6	3	4	5	6					
	M	.130	.130	.150	.160	.180	.135	.150	.160	.170					
1/4-18	N	2	2	3	4	5	2	3	4	5					
	M	.160	.160	.140	.210	.230	.160	.180	.200	.230					
3/8-18	N		2	2	3	4	2	2	3	4					
	M		.180	.180	.210	.240	.180	.180	.210	.230					
1/2-14	N			2	2	3		2	2	3	2	2	3		
	M			.230	.230	.270		.230	.230	.260	.230	.230	.260		
1/2-11 1/2	N													2	2
	M													.290	.290
5/8-11 1/2	N													2	2
	M													.290	.290
3/4-14	N				2	2			2	2		2	2		
	M				.260	.260			.260	.260		.260	.260		
3/4-11 1/2	N													2	2
	M													.290	.290
1-11 1/2	N				1	2			1	2		1	2		
	M				.260	.330			.260	.320		.260	.320		
1 1/4-11 1/2	N					1				1			1		
	M					.300				.300			.300		
1 1/2-11 1/2	N					1				1			1		
	M					.320				.320			.320		

ELEMENTS OF CAM DESIGN

Proper cam selection or design (or its equivalent) is most important in the operation of the Reed Attachment.

The ideal movement of the attachment during one revolution of the cam is to move the center of the rolls to the center line of the work at a predetermined feed per revolution, zero dwell at the center line of the work and then instant rapid return. This is shown schematically in Fig. 55, which also includes elements for general cam design.

It is recommended that cams for thread rolling be ordered direct from the automatic screw machine manufacturer. The following information is necessary when ordering:

Machine model, size and serial number.
Thread rolling position.
Thread size and material.
Suggested work revolutions.
Total advance required plus 25% of the advance to allow time for roll pickup.
*Feed change gears to be used.
*Feed range, fine or coarse.

Since it is important that all cams for thread rolling be designed with no dwell where possible, always specify that the cams are to be used for thread rolling with the Reed Attachment.

*Required on machines using feed change gears only.

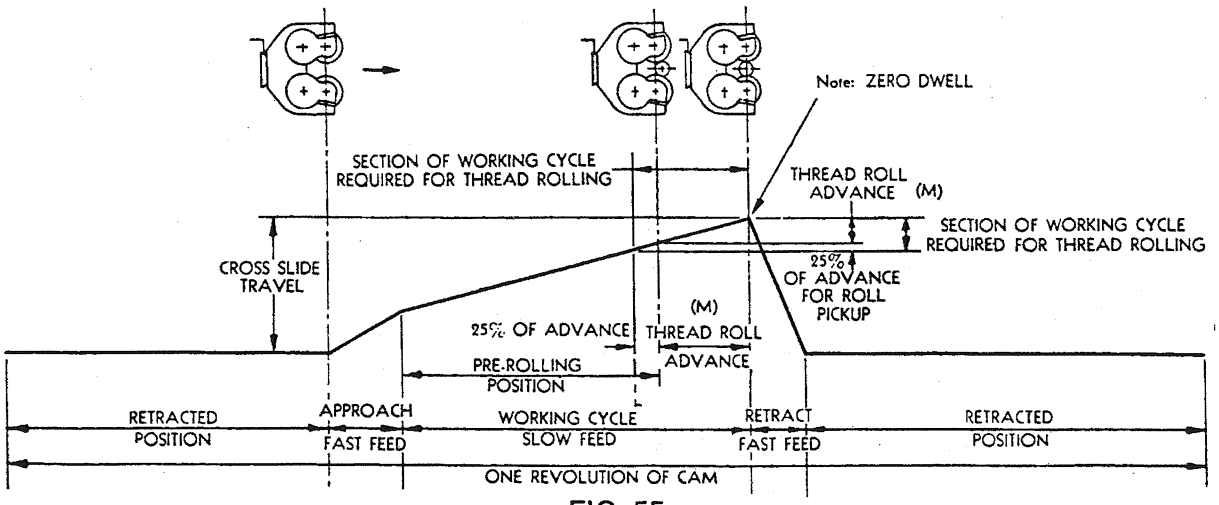


FIG. 55

PREPARATION OF BLANKS

Blank Design

The blanks used for thread rolling are smaller in diameter than the major diameter of the finished thread. When rolling the threads, the rolls penetrate the surface of the blank to form the roots of the threads and in so doing, force the displaced material radially outward to form the crests and the major diameter of the thread. (Fig. 56)

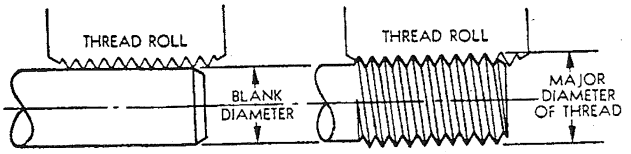


FIG. 56

Correct Blank Required

Since rolling does not remove or compress material, it is necessary that the blank does not contain more than the correct amount of material to form the finished thread. Otherwise, the rolls will become overloaded.

As the volume of the thread above the pitch diameter of an American Standard thread form (when using a thread depth equal to twice the addendum) very nearly equals the volume of the material displaced, it becomes apparent that the diameter of the blank approximates the pitch diameter of the finished thread. This also holds true on similar types of threads which have a balanced thread form — where addendum and dedendum are equal.

Since variation in the diameter of the blank results in variation in the major diameter of the thread, it is necessary that the blank diameter tolerances be controlled according to the accuracy of the thread to be produced. In general, blank diameters should be less than the maximum pitch diameter of the thread and blank diameter tolerances should be as small as practical for economical manufacture.

Blanks Should Be Uniform

Blanks should be as round and straight as possible, as rolling will not entirely correct these inaccuracies. Variation of diameter along the length of the blank should be avoided as uneven distribution of pressure may overload the rolls and result in reduced roll life.

Blanks that are slightly undersize will still give the correct pitch diameter but will have an unfilled crest on the thread. This condition is desirable from the point of view of long roll life providing the unfinished crest is acceptable.

Early roll failure will be the result of blanks whose diameters are outside the maximum diameter specified as this causes an overload condition on the roll. Taper in the blanks will appear as taper in the finished thread. Also, blanks that are out of round will produce out of round threads.

The method recommended for preparing blanks for rolling with the Reed Attachment on screw machines is with the use of shaving tools.

If it is necessary to prepare the blanks using form tools, due to limited tooling positions, it is important the following conditions be considered:

1. Check machine and cross-slide mechanism to be sure the form tool can be operated to control the blank diameter within the recommended tolerances.
2. A periodic check should be made of the blank diameter to make sure it is not exceeding the maximum diameter permissible. This will guard against the possibilities of overloading the rolls and the attachment.

Blank Design for Threads

Recommended designs for various kinds of blanks are shown in Figs. 58 and 59, pages 65 and 66.

Blanks Should Be Beveled

The ends of the blanks should be beveled to prevent excessive chipping of the threads on the rolls. The angle and depth of bevel is important. A bevel of 30° from the axis of the blank, which gives 60° included angle, is preferred for general conditions. The diameter at

the small end of the bevel should be less than the minor diameter of the thread as shown in Figs. 58 and 59. In rolling, the end threads bend outwardly so the bevel on the finished thread approximates the 45° as shown in Fig. 00. Bevels in excess of 30°, such as 45° and 60° with the axis, are detrimental and should be avoided where possible.

Correct Blanks Improve Roll Life

Accurate threads and economical life are closely allied. To secure accurate threads it is necessary to give careful attention to the proper preparation of the blanks. The manufacturer who takes the greatest care in the preparation of blanks produces superior threads and obtains the best roll life. The importance of proper preparation of blanks cannot be overemphasized.

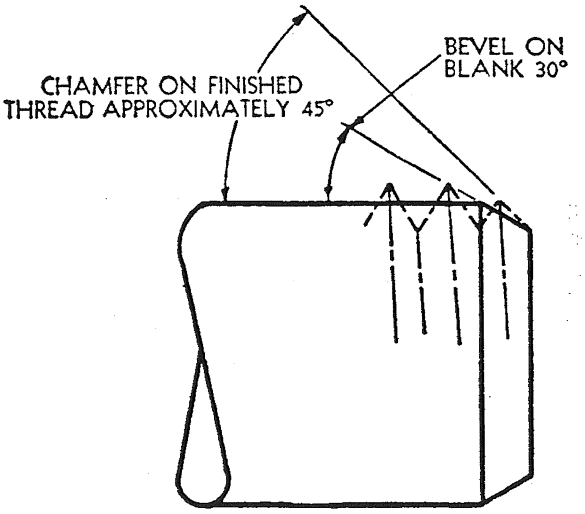


FIG. 57

BLANK DESIGN FOR THREADS

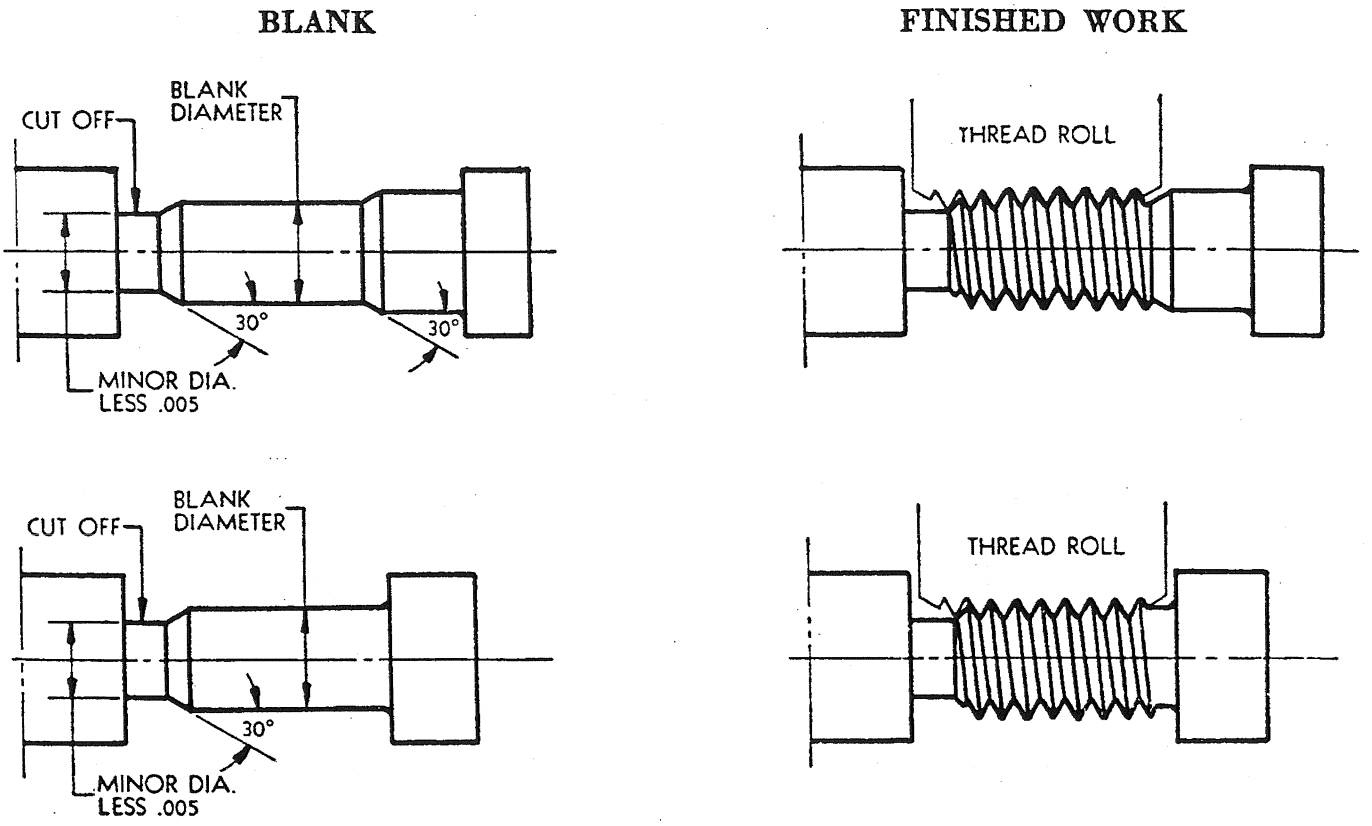


FIG. 58

Blank Design for Threads (Continued)

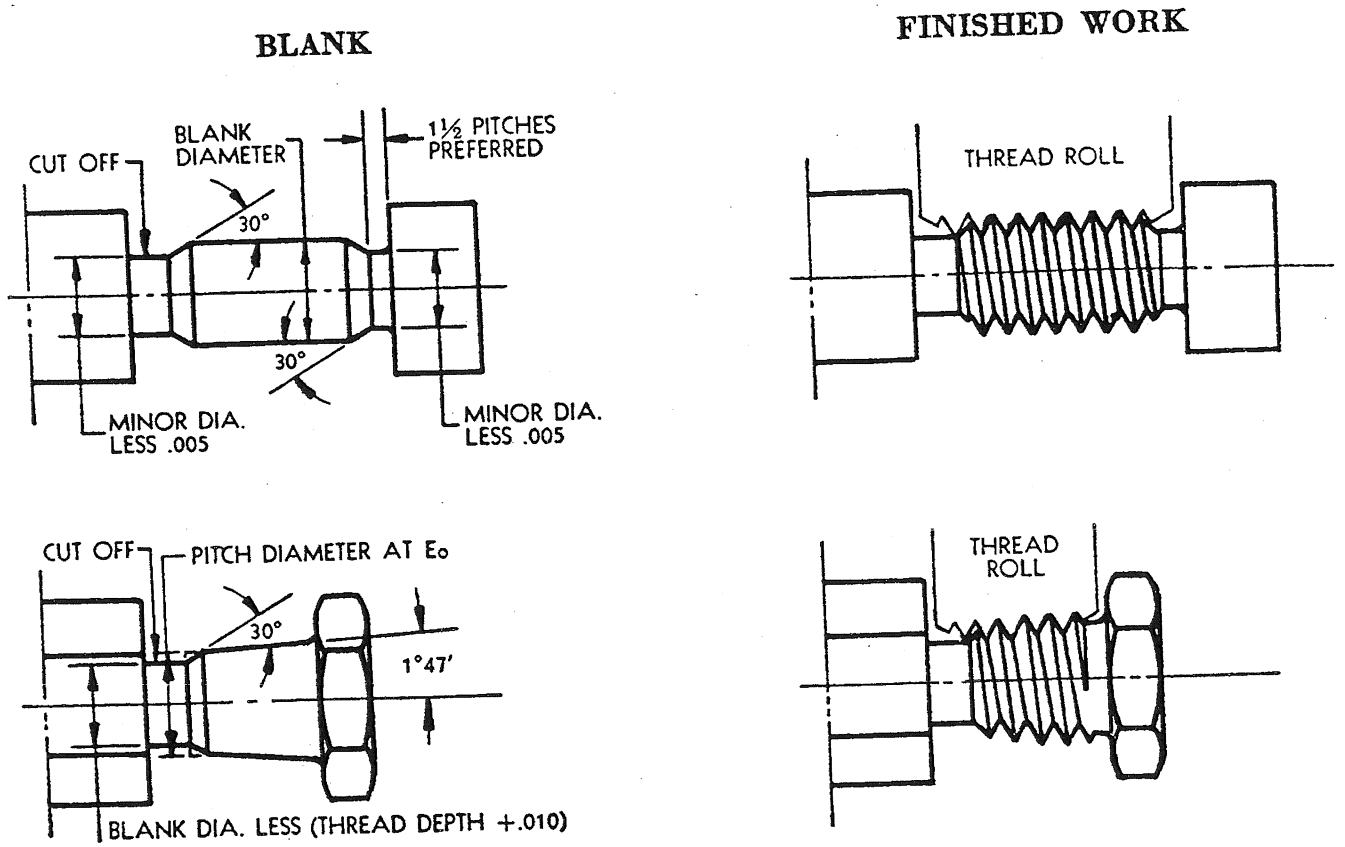


FIG. 59

SUGGESTED BLANK SPECIFICATIONS

Blank Diameter Limits

The blank diameter limits are affected by the kind and hardness of the material used and the nature of the surface finish on the blank. Blanks should have smooth surfaces where accurate threads are required. On shorter thread lengths, and diameters under one quarter inch especially with very soft materials, there is some endwise stretching of the blank. To offset this and obtain sufficient radial displacement of the material it is necessary to increase the blank diameter to compensate for the endwise stretching.

If oversize blanks are used, oversize threads will invariably result. If undersized blanks are used and the dies are adjusted to produce a full thread, undersize major and pitch diameters will result. If the same undersized blanks are used and the dies are readjusted to produce the proper pitch diameter, the crest of the thread will not fill out and the major diameter will be undersize. The proper blank diameter range, therefore, must permit both the smallest and largest blanks to produce finished threads to satisfy the required pitch and major diameter limits. The minor diameter is controlled by the thread form on rolls and the setting of the rolls.

APPROXIMATE BLANK DIAMETERS

Solid Blanks

For Unified Standard Threads less than 1″ in diameter the length of thread should be equal to the diameter. For threads over 1″ in diameter the length of thread should not be less than 1″ long.

Minimum Blank Diameter

The suggested *minimum* blank diameters for various materials may be obtained by adding a percentage of the pitch diameter tolerance to the minimum pitch diameter of the work. Table 31 shows a range of percentages that may be used for different materials.

Maximum Blank Diameter

The *maximum* blank diameter may be obtained by adding the minimum blank diameter to the blank diameter tolerance selected from Table 32.

Short Thread Lengths

On shorter thread lengths, the blank diameters are usually increased by larger percentages than those given to compensate for endwise stretching of the blanks during rolling. The shorter the thread length and the coarser the pitch, the greater the amount of endwise stretching and the more it is necessary to increase the blank diameter.

Table 31

For Determining Approximate Minimum Blank Diameter

Material	Hardness	% of Pitch Diameter Tolerance (Used to determine the amount to be added to Minimum Pitch Diameter)
Aluminum Alloy	Soft	50
	Hard	40
Brass and Bronze		40
Steel:		
10–15 Carbon	Soft	20
30–50 Carbon	Soft	40
30–50 Carbon or Alloy	15–25 Rock. C	50
30–50 Carbon or Alloy	26–32 Rock. C	60
30–50 Carbon or Alloy	33–40 Rock. C	70
Stainless, Chrome-Nickel Alloy (300 Series)		80
Stainless, Chrome Alloy (400 Series)		60

Table 32 — Approximate Blank Diameter Tolerances

These tolerances are used to obtain the maximum blank diameters and should be added to the minimum blank diameters obtained from Table 31. Where the major diameter tolerance is less than twice the pitch diameter tolerance, always use the blank diameter tolerance opposite to the nearest major diameter tolerance shown in the table. Otherwise refer to the pitch diameter tolerance only.

Work Tolerances (in inches)		Thread Diameters — in Inches					
Major Diam.	Pitch Diam.	Up to ½	½–1	1–1½	1½–2	2–2½	2½–5
.002	.001	.0003	.00025	.0002			
.003	.0015	.0005	.0004	.0003			
.004	.002	.0007	.0007	.0006	.0005		
.006	.003	.0010	.0010	.0010	.0008	.0006	
.008	.004	.0013	.0013	.0013	.0010	.0010	
.010	.005	.0015	.0017	.0017	.0015	.0015	.0010
.012	.006	.0020	.0020	.0020	.0020	.0015	.0015
.014	.007	.0023	.0023	.0023	.0023	.0023	.0020
.016	.008	.0025	.0025	.0025	.0025	.0025	.0025
.018	.009	....	.0025	.0030	.0030	.0030	.0030
.020	.010	....	.0030	.0030	.0035	.0035	.0035
.022	.011	....	.0030	.0035	.0035	.0040	.0040
.025	.012	....	....	.0035	.0040	.0040	.0040
.030	.014	....	....	....	.0040	.0040	.0040
.035	.016	....	....	....	.0040	.0040	.0040

Approximate Blank Diameters—Solid Blanks

for American Standard External Taper Pipe Threads

Table 33

Pipe Size	Approximate Dimensions of Blanks—shown in Fig. 60			
	A	B (Ref.)	C	L_2*
1/16-27	.271	.288	.233	.261
1/8-27	.364	.380	.322	.264
1/4-18	.477	.503	.424	.402
3/8-18	.612	.638	.560	.408
1/2-14	.758	.792	.692	.534
3/4-14	.968	1.002	.902	.546
1-11 1/2	1.214	1.256	1.136	.683
1 1/4-11 1/2	1.557	1.601	1.480	.707
1 1/2-11 1/2	1.796	1.841	1.718	.724

*L_2—Effective Length of Thread.

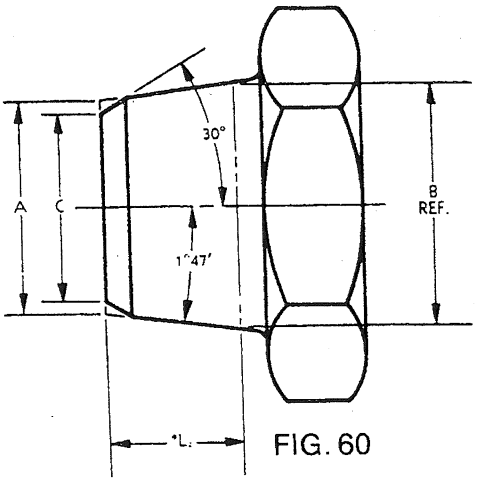


FIG. 60

HOW TO PROLONG ROLL LIFE

Roll life depends upon a number of factors, most important of which are the following:

1. The quality and design of the rolls.
2. The nature of the material to be rolled.
3. The care exercised in the use of the rolls.
4. The use of proper rolls.
5. The correct preparation of the blank.

The quality of the rolls includes accuracy of dimensions, finish and metallurgical properties, while design has to do with a specific application. These are problems of the roll manufacturer who should recommend and furnish dies satisfactory for the job.

The nature of the material to be rolled is usually a specification of the finished part. It must be understood that less roll life may be expected when hard materials, such as stainless are to be rolled compared with the softer materials.

The care exercised in the use of the rolls has a much more important bearing on roll life than is sometimes realized. It is the only factor completely under the control of the operator.

Proper matching is a prime factor in obtaining long roll life. Mismatching will contribute to side or axial motion of the rolls in the attachment, creating side pressures which will affect roll life considerably.

Where permissible, a generous bevel on the edge of the thread rolls will reduce end loading on the edge threads, prolonging roll life by reducing the possibilities of chipping.

Many times, longer roll life is secured by not rolling a full depth thread on a part and thereby not filling the threads in the rolls. This practice excludes a burnished crest on the thread and greatly reduces roll load. It also provides a factor of safety so that an occasional slightly oversized blank will not overload the rolls to the point of destruction.

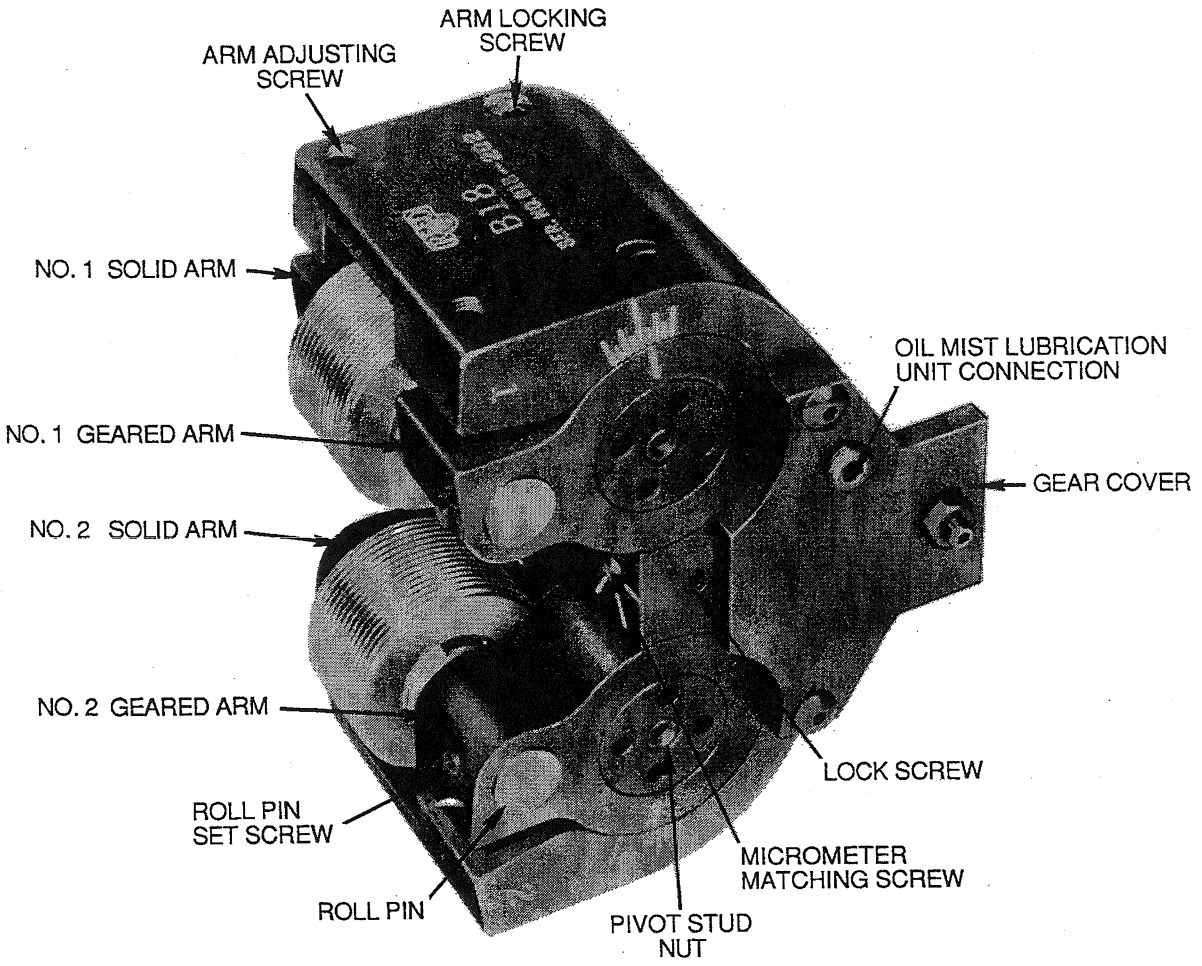
It should be kept in mind that thread rolls are necessarily subjected to heavier loads than any other tool with comparable threaded sections. They are precision tools, and care in using them will result in substantial savings in roll cost through a longer roll life.

KNURLING

The Reed Thread Rolling Attachment can be used for knurling operations, by disengaging the gear train from the rolls. This is accomplished by replacing the drive gears with spacer bushings and permits the use of plain knurling rolls without drive slots. The spacers also provide a means of preventing chips or grit from entering the gear cavity.

Essentially the same setup procedure is followed as for thread rolling with the exception of matching which is not necessary when knurling. Once the correct setting of the arms is made and the blank is made to the required diameter, the rolls will track satisfactorily.

Complete information pertaining to knurling can be found in the Reed Booklet entitled, **"Knurls and Knurling"**



If the attachment has not been in use for some time or there is evidence of grit or chips present in the gear train resulting from continuous operation, the attachment should be disassembled and all parts thoroughly cleaned and oiled.

Insert Rolls and Set for Approximate Match, on Bench

Before inserting rolls, loosen lockscrew and back off micrometer matching screw until head is flush with throat of thread roll head. Then, turn micrometer matching screw clockwise approximately 1 to 1¼ turns. This will position center gear unit to permit correct adjustments for matching.

a. Loosen roll pin setscrews.
b. Remove roll pins.
c. The rolls are furnished in pairs marked "C" and "D" and should be used in pairs only. Insert roll marked "C" in No. 1 side of thread roll head engaging drive lugs of its drive gear with slots on thread roll. Replace roll pin and tighten setscrews on flats of roll pin. (Before matching rolls, adjust arms to approximate gap setting as outlined on page 71.) Turn roll until matching line on roll is approximately at right angles with center line of head as shown in Fig. 61.

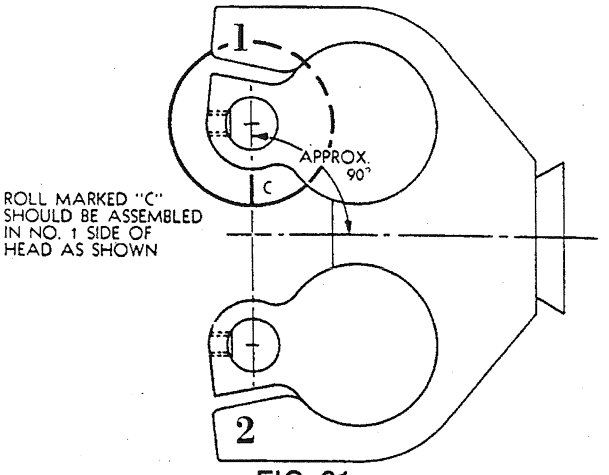


FIG. 61

d. Before inserting roll marked "D" in No. 2 side of thread roll head, the drive gear for this roll should be engaged with idler gear so that when the roll is assembled with its drive gear, the matching line is approximately in line with the matching line of roll "C" as shown in Fig. 62. This will position the rolls in approximate match. It may be necessary to reposition the drive gear of roll "D" by 1 or 2 teeth with the idler gear to obtain this approximate setting. Replace roll pin and tighten setscrews on flats of roll pin.

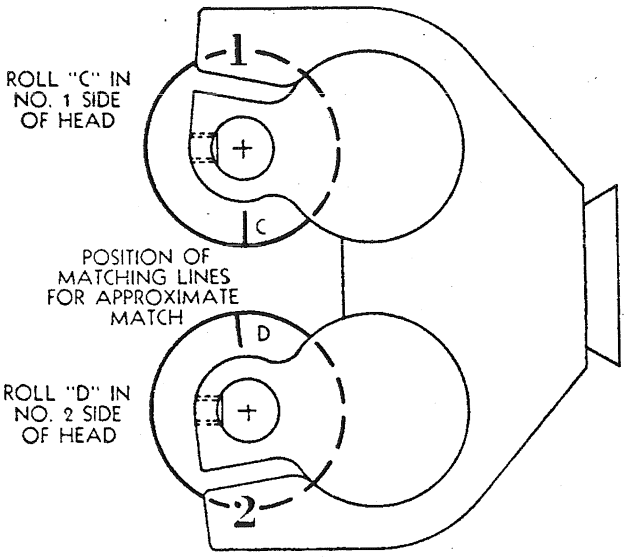


FIG. 62

e. If rolls are of extra wide face with recessed drive slots, insert as follows:
   1. Back out pivot stud nuts, in geared arms with spanner wrench approximately 1/16" more than length of drive gear lug.
   2. Loosen geared arm locking screws to allow arms, with the driving gears, to be moved out to contact pivot stud nuts.
   3. Insert rolls in head as outlined in "c" and "d", sliding arms into position to engage driving gears with rolls.
   4. Lightly tighten pivot stud nuts.

Adjust Arms for Approximate Spacing of Rolls, on Bench

Before proceeding with the required spacing adjustment, it is necessary to loosen the four pivot stud nuts, approximately one-quarter turn, with a spanner wrench to permit arms to pivot in their retaining sockets. To increase the distance between the rolls, loosen the four arm adjusting screws and open the arms by tightening the four arm locking screws. To decrease the distance between rolls, the arm locking screws would be loosened and the arm adjusting screws tightened.

a. The arms should be adjusted to the approximate gap setting between the rolls with equal spacing between the arms and the head. This is accomplished by placing a gage block (approximately equal to the minor diameter of the thread), between the rolls as shown in Tables 34 and 35 on pages 74 and 75 which also lists the gap setting dimensions "G" for Unified and American External Screw Threads and shows suggested designs of roll gap setting gages. Adjust arms, with the gage in place between the rolls until the marks on the No. 1 and No. 2 geared arms line up with the *same* graduation on the head body. Tables 36 and 37 on page 76 list the gap setting dimensions for American External Straight and Taper Pipe Threads.

b. With the geared arm adjusting screws in light contact with the arms, lock arms in this position by tightening arm locking screws. Loosen roll pin setscrews and adjust No. 1 and No. 2 solid arms until roll pins slide freely. Lock solid arms in this position with arm locking screws, maintaining free movement of roll pins by tightening or loosening arm adjusting screws if necessary.

c. Tighten roll pin setscrews and pivot stud nuts, thus completing the initial phase of the setup. This gives the approximate spacing of the rolls so that only a small amount of adjustment is required for final sizing at the time of rolling.

Important — The solid arm clamping nuts are to be tightened first to prevent extracting the arm pivot shaft from its position in the head body.

ROLL GAP SETTING INSTRUCTIONS

Anti-Friction Thrust Bearings[1]

The latest design Reed Series "B" Thread Rolling Attachments, for automatic screw machines and lathes, incorporates the use of anti-friction thrust bearings on both sides of the thread roll. Since thrust develops in both directions during rolling, this unique feature will contribute greatly to improved performance and trouble free operation. The increased strength and stability resulting from this new design permits easier rolling of Acme, worm, multi-start and tapered threads, both left and right hand, along with all the standard thread patterns normally produced on Reed Thread Rolling Attachments.

Matching of Rolls

Accurate matching of thread rolls is an important requirement to assure top performance. To get maximum benefits of a precise match, the proper amount of side play (axial movement) of the thread rolls must be provided. This is the amount of clearance between the solid arm thrust bearing and the thread roll as shown below. The amount of clearance varies for each size attachment.

[1]Thrust bearings are installed w/ rotating race toward thread roll

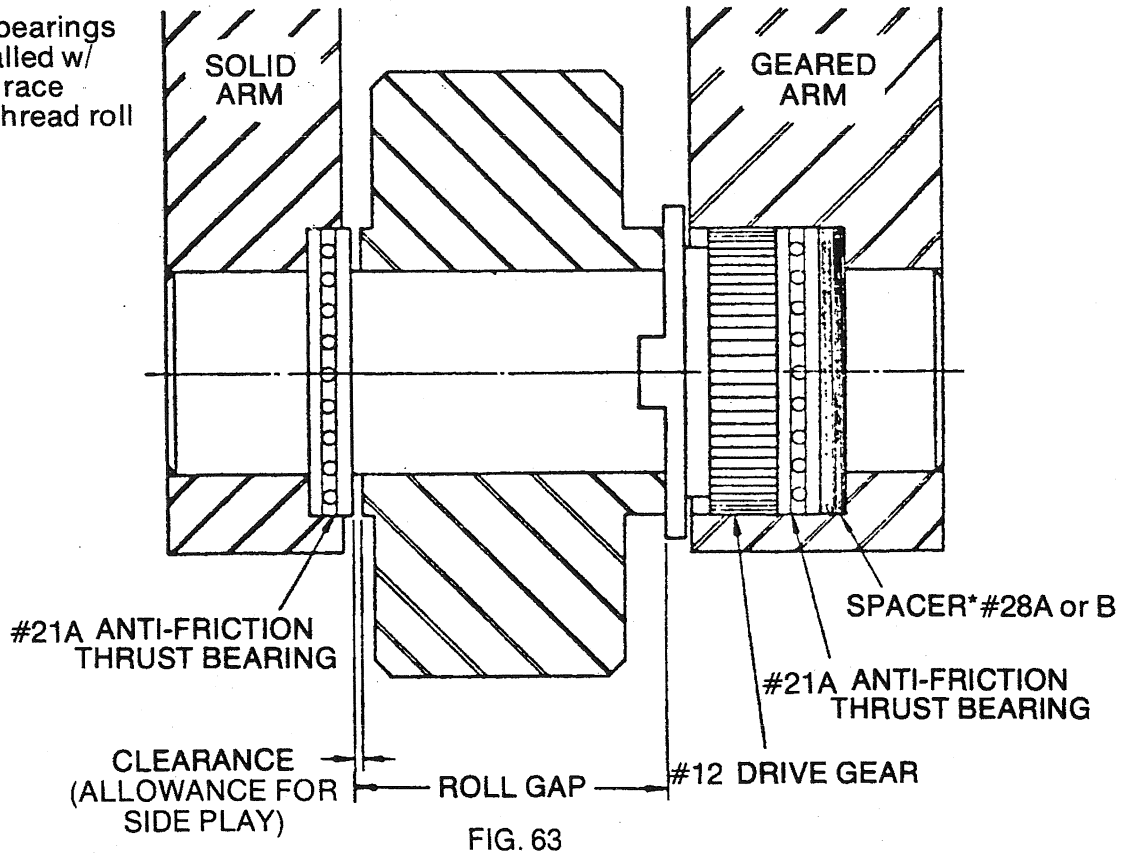


FIG. 63

When the amount of side play in the Series B Attachments equipped with thrust bearings is greater than the amount shown in the chart, the spacer should be checked and replaced if wear is evident.

The width of roll gap, which determines the amount of clearance, is controlled by facing off the spacer in the geared arm at assembly.

REED MODEL #	RECOMMENDED CLEARANCE	CORRESPONDING ROLL GAP
B5	.002-.005	REFER TO FACTORY
B8	.002-.005	.582- .584
B10	.002-.005	.781-. 783
B13	.003-.006	1.037-1.039
B18	.003-.006	1.287-1.289
B36	.004-.008	1.288-1.291

*GRIND SPACER FOR ROLL GAP

A Tip for Top Performance

Accurate matching of the thread rolls in thread rolling attachments is an important requirement to assure top performance. To get the maximum benefits of a precise match, the proper amount of side play (axial movement) of the thread rolls must be provided. This is the amount of clearance between the solid arm thrust bearing and the roll as shown below. The amount of clearance varies for each size attachment as shown in the table on page 71.

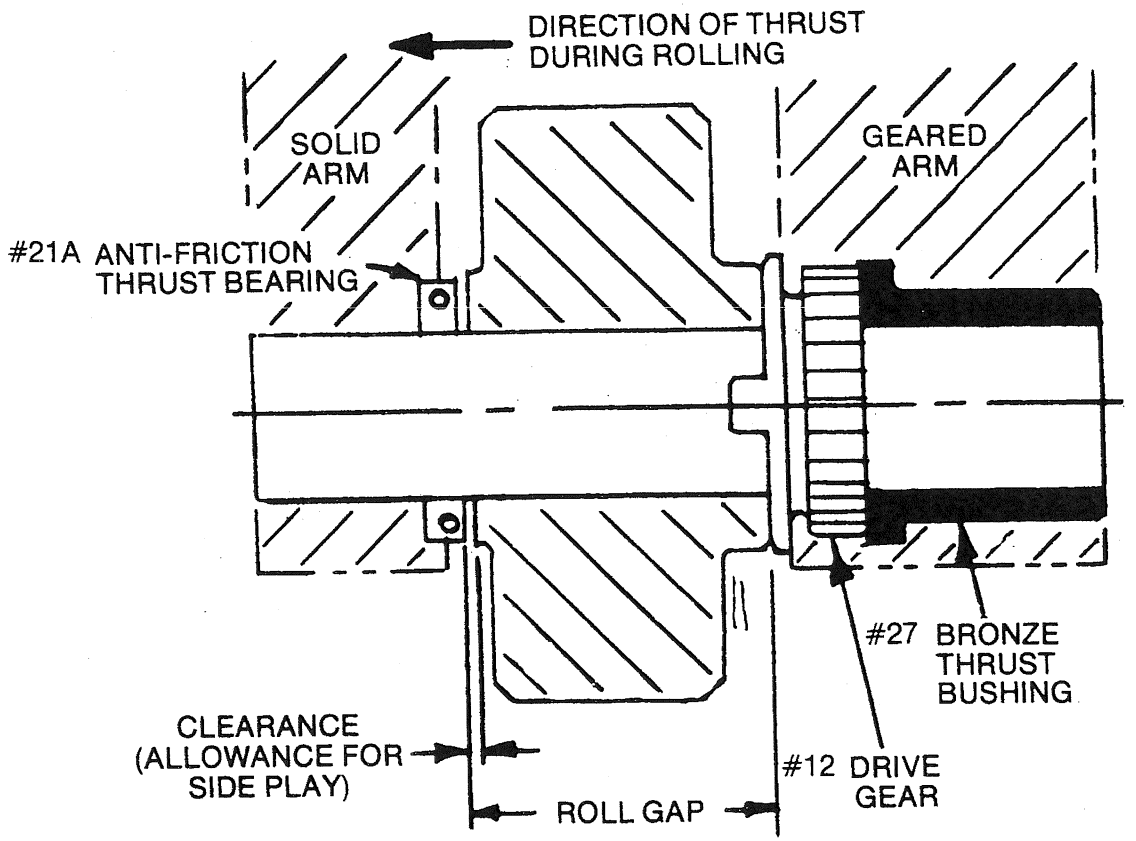


FIG. 64

Since any thrusts developed during rolling are usually towards the solid arm and its antifriction thrust bearing, these bushings are not generally subject to excessive wear. However, when the amount of side play in Series B Attachments equipped with bronze thrust bushing is greater than the amount shown in the table, the bushing should be checked and replaced if wear is evident.

The width of roll gap, which determines the amount of clearance, is controlled in the Series B Attachments by facing off the bronze thrust bushing in the geared arm at assembly to obtain the proper width of roll gap as shown in the table on page 71.

Accurately matched thread rolls with the proper amount of clearance, in addition to producing quality threads will contribute greatly towards getting maximum life of the rolls and top performance of the thread rolling attachment.

Note: The same clearance requirements apply to the Series B Attachments or Series G2A Attachments originally equipped with *carbide thrust washers* in the geared arm. If excessive side play exists in these attachments, refer to the factory for recommendations to correct this condition.

Matching the Rolls

The threads on the rolls must follow the helical track produced on the work throughout the entire formation of the thread. When the rolls are in full straddle position over the work, the crests of the thread on one roll must be opposite the root of the threads on the other roll. The accuracy of matching to insure this set of conditions cannot be overemphasized and has considerable bearing on the quality of the thread produced.

For ease in accurate matching, a reference line is marked on the drive hub side of each roll. In the case of reversible type rolls, these lines appear on each side. After the correct setting of the arms has been made according to the instructions previously outlined, proceed with the matching of the rolls as follows:

a. With the approximate match obtained by following the procedure outlined on page 69, it is now only necessary to insert the hex wrench in the micrometer matching screw and turn in either direction until matching lines on both rolls are directly opposite and in line with each other as shown in Fig. 66. The drive gears are designed with drive lugs providing a close fit with slots in rolls for positive matching and accurate matching adjustment of rolls.

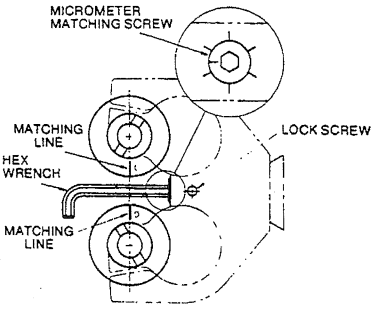


FIG. 65

b. With rolls in this position, lock the micrometer matching screw by tightening the lock screw. This matching position will insure correct relationship of the threads on the rolls from initial contact of the rolls with the work to the full straddle position when the rolls have penetrated to the full depth of thread.

Thread Roll Gap Setting — "G" Dimensions

for Unified External Screw Threads

To position the rolls for the approximate gap setting "G", adjust arms with gage in place between rolls until the marks on No. 1 and No. 2 geared arms line up with same graduation on head body. It also assures equal adjustment of arms so the spaces "A" are approximately the same and angles "B" are equal.

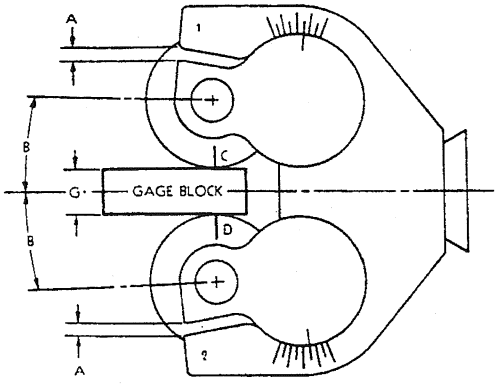


FIG. 66

The "G" dimension for any thread size not given in the chart can be determined by the following formula:

$G = E\ max. - h_b$

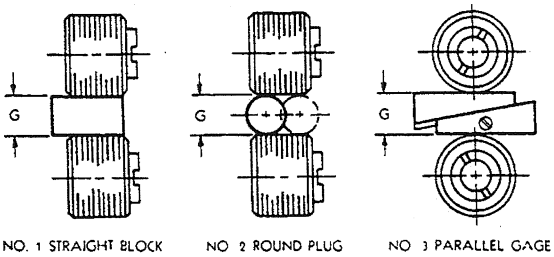
where:

E max. = Maximum pitch diameter of the thread

h_b = Twice the external thread addendum.

OPTIONAL DESIGN OF ROLL GAP SETTING GAGES

for Unified and American External Screw Threads



NO. 1 STRAIGHT BLOCK NO 2 ROUND PLUG NO 3 PARALLEL GAGE

Table 34 — Thread Roll Gap Setting — "G" Dimensions

Unified Threads

THREAD SIZE		
DIAM.	THDS. PER INCH	G DIM.
2	56	.062
	64	.065
3	48	.071
	56	.075
4	40	.079
	48	.084
5	40	.092
	44	.095
6	32	.097
	40	.105
8	32	.123
	36	.127
10	24	.135
	28	.143
	32	.149
	36	.153
	40	.157
	48	.162
	56	.166
12	24	.161
	28	.169
	32	.175
	36	.179
	40	.183
	48	.188
	56	.192
1/4	20	.184
	24	.194
	28	.203
	32	.208
	36	.213
	40	.217
	48	.222
	56	.226
5/16	18	.239
	20	.246
	24	.257
	28	.265
	32	.271
	36	.276
	40	.279
	48	.285
3/8	16	.293
	18	.302
	20	.309
	24	.320
	28	.328
	32	.333
	36	.338
	40	.342
7/16	14	.343
	16	.355
	18	.302
	20	.371
	24	.382
	28	.390
	32	.396

THREAD SIZE		
DIAM.	THDS. PER INCH	G DIM.
1/2	12	.390
	13	.399
	14	.406
	16	.417
	18	.427
	20	.434
	24	.445
	28	.453
	32	.458
9/16	12	.453
	14	.468
	16	.480
	18	.489
	20	.496
	24	.507
9/16	28	.515
	32	.521
5/8	11	.505
	12	.515
	14	.531
	16	.543
	18	.551
	20	.559
	24	.570
	28	.578
	32	.583
11/16	12	.578
	24	.632
13/16	12	.703
	16	.730
	20	.746
3/4	10	.618
	12	.640
	14	.656
	16	.667
	18	.676
	20	.684
	24	.695
	28	.702
	32	.708
7/8	9	.729
	10	.733
	12	.765
	14	.781
	16	.792
	18	.801
	20	.809
	24	.820
	28	.827
	32	.833
15/16	12	.828
	16	.855
	20	.871

THREAD SIZE		
DIAM.	THDS. PER INCH	G DIM.
1	8	.836
	10	.868
	12	.890
	14	.906
	16	.917
	18	.926
	20	.934
	24	.945
	28	.952
	32	.958
1 1/16	12	.953
	16	.980
	18	.989
1-1/8	8	.961
	10	.993
	12	1.015
	14	1.031
	16	1.042
	18	1.051
	20	1.059
	24	1.070
	28	1.077
1-3/16	12	1.078
	16	1.105
	18	1.114
1-1/4	8	1.086
	10	1.118
	12	1.140
	14	1.156
	16	1.167
	18	1.176
	20	1.184
	24	1.195
1-5/16	12	1.203
	16	1.230
	18	1.239
1-3/8	8	1.210
	10	1.243
	12	1.265
	14	1.281
	16	1.292
	18	1.301
	20	1.310
	24	1.321
1-7/16	12	1.327
	16	1.355
	18	1.364
1 1/2	8	1.335
	10	1.368
	12	1.390
	14	1.406
	16	1.417
	18	1.426
1-1/2	20	1.434
	24	1.445
1-9/16	16	1.480
	18	1.489

THREAD SIZE		
DIAM.	THDS. PER INCH	G DIM.
1-5/8	8	1.460
	10	1.493
	12	1.515
	14	1.531
	16	1.542
	18	1.551
	20	1.559
	24	1.570
1-11/16	16	1.605
	18	1.614
1-3/4	8	1.586
	10	1.618
	12	1.640
	14	1.656
	16	1.667
	18	1.676
	20	1.684
1-13/16	16	1.730
1-7/8	8	1.710
	10	1.743
	12	1.765
	14	1.781
	16	1.792
	18	1.801
	20	1.809
1-15/16	16	1.855
2	8	1.835
	10	1.868
	12	1.890
	14	1.906
	16	1.917
	18	1.926
	20	1.934
2-1/16	16	1.980
1-1/8	8	1.960
	12	2.015
	16	2.042
2-3/16	16	2.105
2-1/4	8	2.085
	10	2.118
	12	2.140
	14	2.156
	16	2.167
	18	2.176
	20	2.184

Table 35 — Thread Roll Gap Setting — "G" Dimensions

for Metric Thread ISO

THREAD SIZE		G DIM.
Diam.	Pitch	
M1.8	0.35	.053
M2.0	0.4	.058
M2.2	0.45	.064
M2.5	0.45	.075
M3.0	0.50	.093
M3.5	0.60	.107
M4.0	0.70	.121
M4.5	0.75	.139
M5.0	0.80	.156
M6.0	1.00	.185
M7.0	1.00	.225
M8.0	1.00	.264
M8.0	1.25	.251
M10	1.00	.343
M10	1.25	.330
M10	1.50	.317
M12	1.25	.408
M12	1.75	.383
M14	1.50	.474
M14	2.00	.449
M16	1.50	.553

THREAD SIZE		G DIM.
Diam.	Pitch	
M16	2.00	.528
M18	1.50	.632
M18	2.50	.581
M20	1.50	.710
M20	2.50	.659
M22	1.50	.789
M22	2.50	.738
M24	2.00	.843
M24	3.00	.792
M27	2.00	.961
M27	3.00	.910
M30	2.00	1.079
M30	3.50	1.002
M33	2.00	1.197
M33	3.50	1.120
M36	3.00	1.264
M36	4.00	1.213
M39	3.00	1.382
M39	4.00	1.331
M42	4.50	1.423

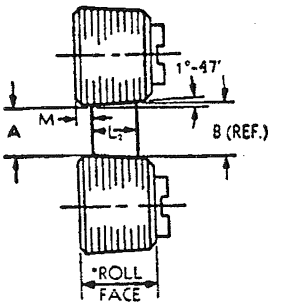
Table 36 — Thread Roll Gap Setting

for American Standard External Taper Pipe Threads

GAGE AND SETUP DIMENSIONS

Pipe Size	Gage Dimensions			Setup Dimensions	
	A	L_2	B (Ref.)	M	*Roll Face Width (Standard)
1/16-27	.242	.261	.258	.046	.354
1/8-27	.334	.264	.350	.046	.357
1/4-18	.433	.402	.458	.069	.541
3/8-18	.568	.408	.593	.069	.547
1/2-14	.701	.534	.735	.089	.712
3/4-14	.911	.546	.945	.089	.724
1-11 1/2	1.144	.683	1.187	.109	.900
1 1/4-11 1/2	1.488	.707	1.532	.109	.924
1 1/2-11 1/2	1.727	.724	1.772	.109	.941

TAPERED GAGE BLOCK



A = Pitch diameter at E_0 of Standard External Pipe Thread (−) less maximum height of thread.

L_2 = Effective thread length.

*Applies to all sizes of heads and is equal to the L_2 thread lengths plus 2 1/2 pitches for rolling threads to the standard L_2 lengths. Unless otherwise specified all rolls for the standard pipe sizes are furnished with the roll face widths shown and include 45° bevels on both edges.

Table 37 — Thread Roll Gap Setting

for American Standard External Straight Pipe Threads

"G" DIMENSIONS

Straight Pipe Size		"G" Dim.
1/16-27	NPSL	.358
1/16-27	NPSM	.349
1/4-18	NPSL	.464
1/4-18	NPSM	.450
3/8-18	NPSL	.600
3/8-18	NPSM	.587

Straight Pipe Size		"G" Dim.
1/2-14	NPSL	.746
1/2-14	NPSM	.728
1/2-14	NPSH	.729
1/2-11 1/2	NH	.945
5/8-11 1/2	NH	.945
3/4-14	NPSL	.956

Straight Pipe Size		"G" Dim.
3/4-14	NPSM	.939
3/4-14	NPSH	.939
3/4-11 1/2	NH	.945
1-11 1/2	NPSL	1.200
1-11 1/2	NPSM	1.178
1-11 1/2	NPSH	1.177

Straight Pipe Size		"G" Dim.
1 1/4-11 1/2	NPSL	1.544
1 1/4-11 1/2	NPSM	1.523
1 1/4-11 1/2	NPSH	1.522
1 1/2-11 1/2	NPSL	1.783
1 1/2-11 1/2	NPSM	1.761
1 1/2-11 1/2	NPSH	1.761

Install and Make Final Adjustment of Attachment on Machine

Before installing attachment on machine, check work for proper blank preparation including diameter. Refer to page 64 for information on blank preparation.

a. Attach the adapter to the machine cross slide and position in relation to collet face so when head is later assembled to adapter, the rolls will be in approximately the correct relation to the spindle or work as required. See Fig. 67.

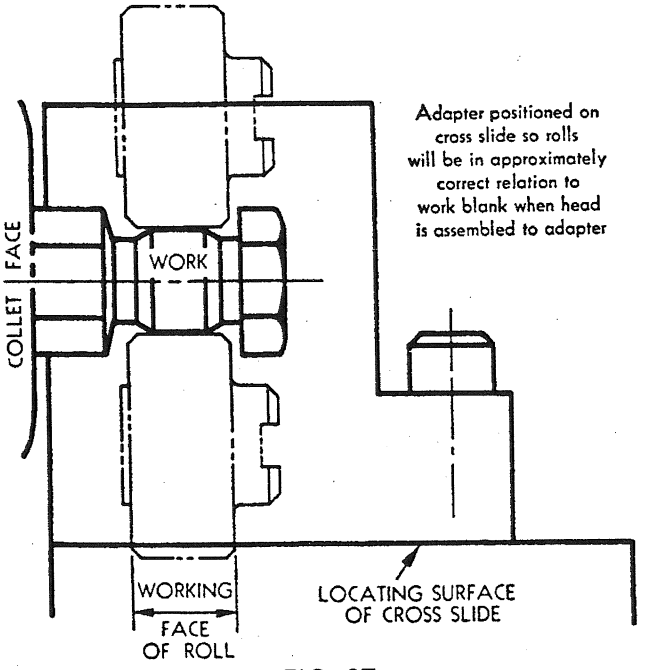


FIG. 67

b. If the adapter is of the nonadjustable design, set to full retracted position by means of adjustment in machine cross slide. On machines without adjustment in the cross slide, the adjustable adapter is used and adjusted to its retracted position.

c. Set micrometer forward positioning gage to the reading marked on the thread rolls as shown in Fig. 70 on page 79, and insert in adapter, locking it securely in place with screws in the adapter dovetail clamp.

d. Position machine cross slide at the high point of its actuating cam, placing the slide in the extreme forward position. With the cross slide in this position, the high point of the cross slide feed cam should be synchronized with the fast speed cycle of the machine as shown in Fig. 68.

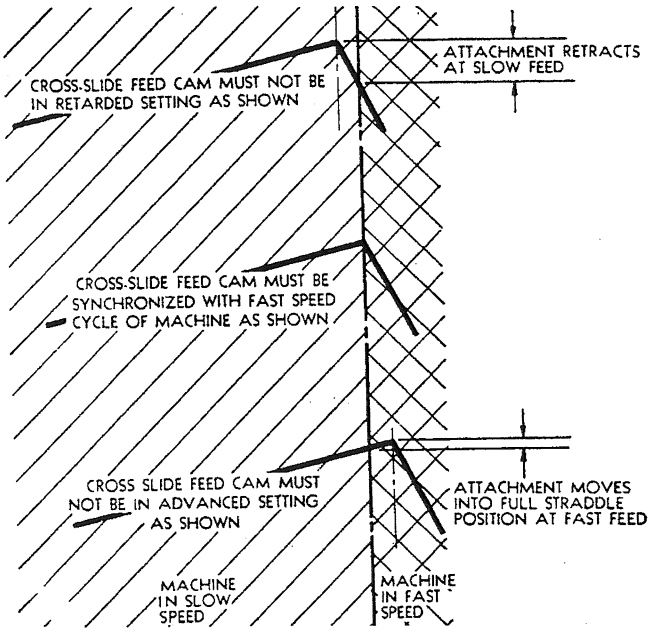


FIG. 68

An accumulation of work revolutions caused by a slow return of the attachment will result from a *retarded* setting of the cross slide feed cam in relation to the fast speed cycle of the machine. Slow return of the attachment, due to a retarded setting, will cause undesirable side pressure on the roll tooth form and possible chipping of the rolls.

An increased penetration rate, caused by a fast feed of the attachment during the final revolutions of the rolling cycle will result from an *advanced* setting of the cross slide feed cam in relation to the fast speed cycle of the machine. An increased penetration rate due to the advanced setting, will cause the rolls to suddenly plunge forward exerting additional load on the attachment.

e. The adapter with the gage in place is then adjusted by means of the cross slide adjustment or adapter adjusting screw until the contact screw of the micrometer forward positioning gage lightly contacts the work blank which has been formed or shaved to the correct rolling diameter. Refer to Fig. 69 on page 78.

f. The machine is then operated to return the cross slide to full retracted position at the low point of its actuating cam.

g. With the cross slide in its retracted position, the micrometer adjusting gage is removed from the adapter.

h. At this point in the installation of the attachment on the machine, it is recommended that the feed rate of the cross slide be checked. The cross slide feed cam should be designed to provide the correct number of work revolutions and feed rate as outlined on page 63.

A suggested method of checking the feed per revolution of the cross slide is as follows:

1. Attach a dial indicator on the cross slide frame or suitable solid mounting on the machine with the indicator contacting the cross slide, as shown in Fig. 72, page 79.
2. Mark the spindle or bar stock and operate the machine until the cross slide is advanced to the rolling position. With the cross slide in this position jog the machine for several revolutions with the dial indicator in contact with the cross slide. The rate of feed of the cross slide per revolution of the spindle, can then be determined by dividing the amount of movement of the cross slide (reading on dial indicator) by the number of spindle revolutions counted during that movement.

Gage Setting Instructions for Forward Positioning of Rolls

The micrometer forward positioning gage is used for setting the attachment so that the center lines of both rolls are in line with the center line of the work when the machine cross slide is at its forward position and on the high point of the cam.

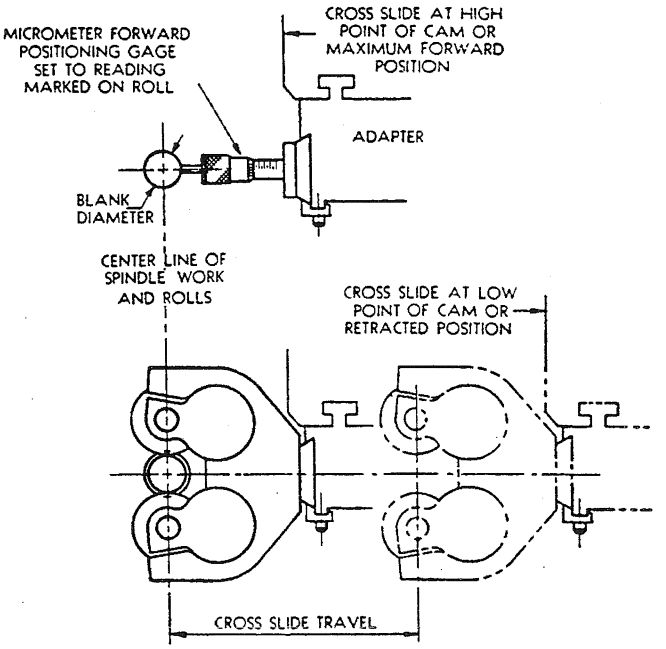


FIG. 69

For taper pipe threads follow the same procedure as outlined in steps 1 and 2, and locate micrometer forward positioning gage on work blank as shown in Fig. 69. The "Y" dimensions for taper pipe threads having a standard L_2 length of effective thread are given in the Table 38 below.

Table 38

Pipe Size	Y	Pipe Size	Y
1/16-27	.130	3/4-14	.273
1/8-27	.132	1-11 1/2	.341
1/4-18	.200	1 1/4-11 1/2	.353
3/8-18	.203	1 1/2-11 1/2	.362
1/2-14	.266	—	—

1. Set micrometer forward positioning gage to the reading marked on the thread rolls. The correct micrometer readings may be found in two different positions as shown in Fig. 70. If the design of roll furnished does not provide sufficient space for marking in either of the positions shown, a tag is tied to the rolls giving the correct micrometer reading.

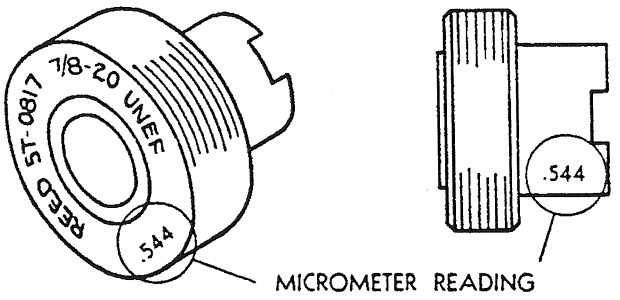


FIG. 70

Insert gage in adapter, locking it securely in place with screws in the adapter dovetail clamp. Position machine cross slide in the extreme forward position at the high point of its actuating cam. Adjust adapter with gage in place by means of the cross slide adjustment or adapter adjusting screw, until the micrometer gage contact screw lightly contacts the work blank which has been formed or shaved to the correct rolling diameter. See Fig. 69.

2. Operate the machine to return the cross slide to full retracted position. Remove the micrometer forward positioning gage from the adapter. Insert thread roll head in dovetail slot in the adapter and lock securely in place with screws in dovetail clamp. This will automatically position the center line of the rolls on the center line of the work at the time the thread rolling attachment is in its full forward rolling position and the cross slide is on the high point of the cam. Refer to Fig. 69.

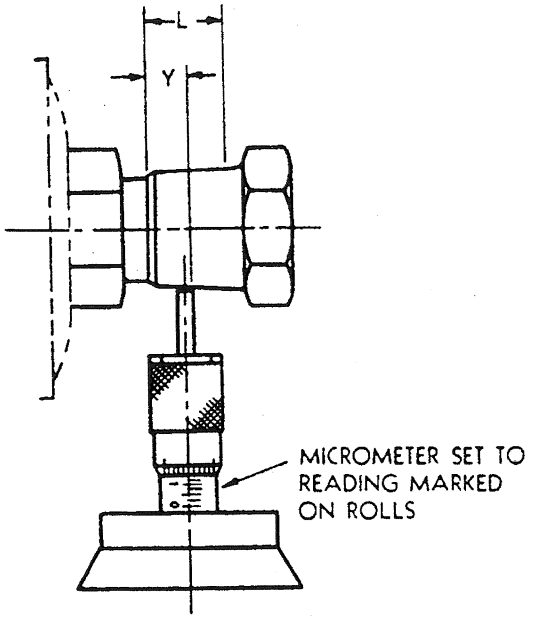


FIG. 71

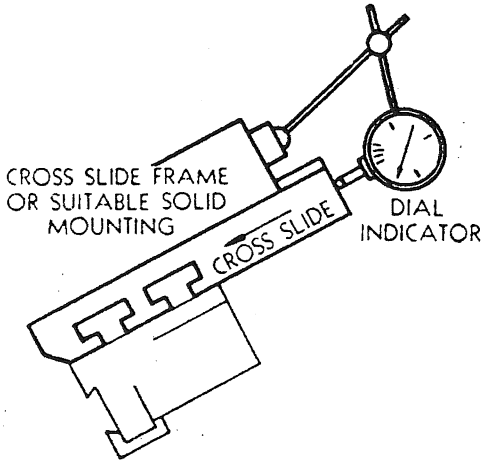


FIG. 72

i. Insert thread roll head in the dovetail slot in the adapter and lightly tighten screws in the adapter dovetail clamp. This will automatically position the center line of the rolls on the center line of the work at the time the thread rolling attachment is in its full forward rolling position and the cross slide is on the high point of the cam as shown in Fig. 69.

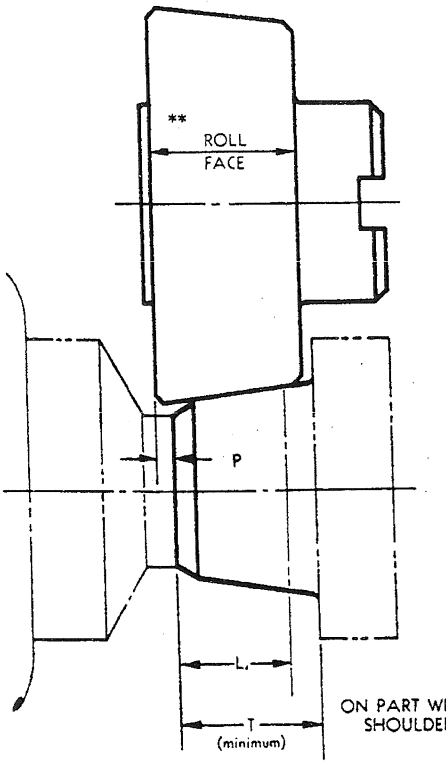
j. Loosen the hold down bolts in the adapter a sufficient amount to permit adjustment of the attachment on the cross slide to align the thread rolls in their correct position relative to the collet face or shoulder on the work. Advance the cross slide slowly, checking this alignment as the rolls come in light contact with the work. Axial location of the rolls relative to the work can be accomplished by adjusting the head in the dovetail slot in the adapter or by adjustment of the gibs or side screws on the cross slides.

It is important when setting up for rolling taper pipe threads that the axial location of the rolls relative to the work is accurate. The correct axial location of the rolls for American Standard Pipe Threads is given in Table 39. The P dimensions apply only when using rolls having a standard width of roll face for rolling threads to the Standard L_2 lengths.

When the application will not permit positioning rolls having a standard width of roll face according to Table 39, special rolls may be needed. These applications should be referred to the factory with complete part specifications for review. Taper pipe rolls cannot be altered to suit the application. The quality of the thread, and the performance of the attachment may be affected if rolls originally furnished are altered.

Table 39 — Location of Rolls in Relation to Blank

for American Standard Taper Pipe Threads*
When Using Rolls Having Standard Width of Roll Face**



Taper Pipe Size	T	L_2	**Roll Face Width (Standard)	P
1/16–27	5/16	.261	.354	3/64
1/8–27	5/16	.264	.357	3/64
1/4–18	1/2	.402	.541	1/16
3/8–18	1/2	.408	.547	1/16
1/2–14	21/32	.534	.712	3/32
3/4–14	21/32	.546	.724	3/32
1–11 1/2	27/32	.683	.900	7/64
1 1/4–11 1/2	27/32	.707	.924	7/64
1 1/2–11 1/2	7/8	.724	.941	7/64

*Taper Pipe Threads with standard L_2 effective length of thread.

**Applies to all sizes of heads and is equal to the L_2 thread length plus 2½ pitches. Unless otherwise specified all rolls for standard pipe sizes are furnished with the roll face widths shown and include 45° bevels on both edges.

k. When proper alignment has been obtained, secure attachment to the cross slide by means of hold down bolts on the adapter or tool clamps on the cross slide. *Note:* The dovetail design of the connection between the head and the adapter makes it possible to easily remove the head from the machine for changing rolls or for convenience in making adjustments without removing the adapter from the cross slide. The head will always be reassembled in the adapter on the cross slide in the same relative position to the work with either the dovetail in the adapter or a stop screw on the head providing a means for positive location. These arrangements are illustrated in Figs. 73 and 74.

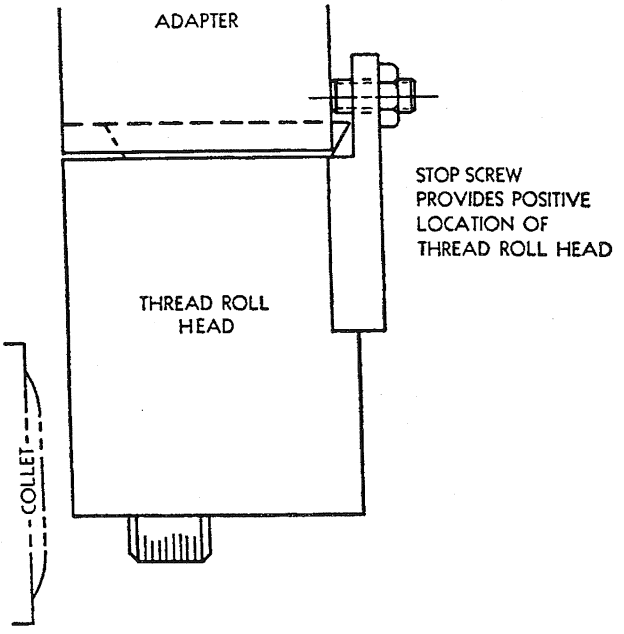


FIG. 73

l. Check blanks on machine for uniformity and correct sizing.
m. Check *all* adjustments and make sure setscrews are properly tightened.
n. Operate the machine to roll a thread and check the thread to the required specifications. If further adjustments are required, they can usually be made without removing the attachment from the machine.

Adjustment to overcome taper can be made by adjusting the individual arms as necessary. It is important when adjusting to correct taper that both arms on the side required are moved an equal amount as shown in Table 34 on pages 73 and 74. If only one arm is adjusted to try to overcome taper, a slight out-of-match condition may result. After making adjustments, always check for free movement of roll pins.

Further matching of rolls, if required, can be made in the machine by varying the position of the matching lines slightly. In most cases the accuracy of the match can be determined by observing the crest condition of the rolled thread through a magnifying glass. Usually, when the rolls are in perfect match, the formation of the crests will appear symmetrical as shown in Fig. 75. A poor match may result in a nonsymmetrical crest formation as shown in Fig. 76, and ordinarily is more pronounced on fine pitch threads. Although the crest may appear symmetrical, other conditions in the thread form, such as slivers or poor root form, may indicate a poor match.

Final sizing is accomplished *on the machine* as outlined on page 73. When all adjustments are complete and the threads rolled to required specifications, make sure that all members and adjusting screws are properly tightened before proceeding with rolling. Check locking screws during down time.

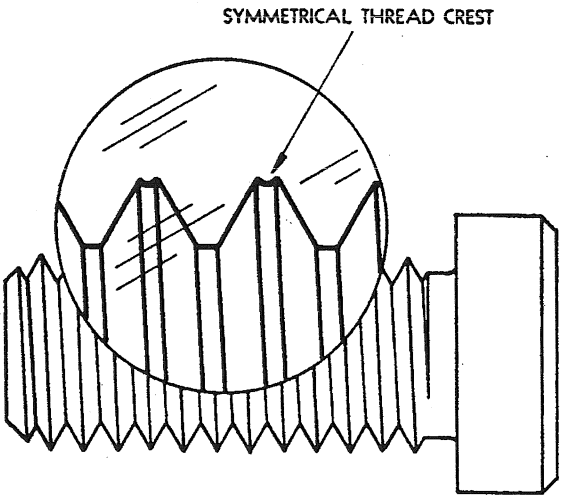


FIG. 75

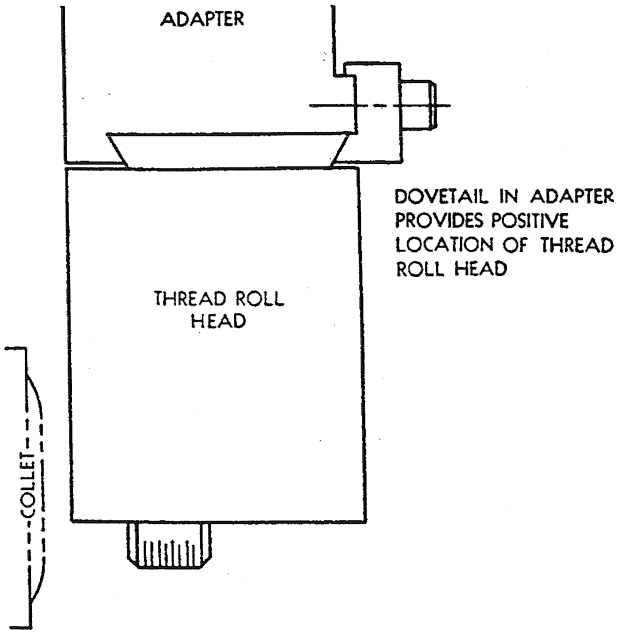


FIG. 74

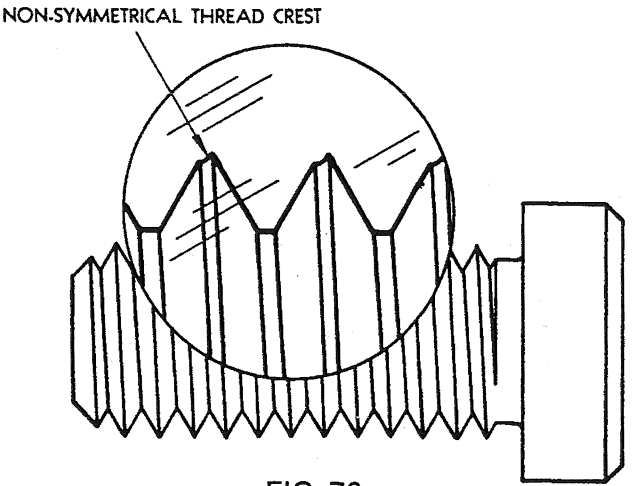


FIG. 76

Change Rolls in Head

To change rolls of the same diameter and thread size, remove thread roll head from the machine and repeat the steps outlined in the section on insertion of rolls in head, found on page 69. It is advisable to compare the outside diameter of the new rolls with the outside diameter of the rolls being replaced as variation of the outside diameter of the rolls due to manufacturing tolerances may require a slight adjustment of the arms to maintain the correct size of work. Match the rolls as outlined on page 71.

When changing to rolls of a different diameter and thread size remove head and adapter from machine and repeat the complete setup procedure.

Oil Mist Lubrication Unit

An oil mist lubrication unit is available for all Reed Series B Thread Rolling Attachments. It is recommended for all installations and is a necessity where water-soluble coolants are used.

This unit provides clean filtered oil with air pressure to the operating mechanism in the attachment. Harmful chips and gummy deposits of machine coolant are prevented from entering the attachment resulting in reduced maintenance and longer life.

Figure 77 shows the assembly of this unit which is connected to the gear cover of the thread roll head. If connection of this unit is not made during initial setup of the attachment on the machine, a generous amount of lubricating oil should be supplied to the gear train of the head through the oil mist lubrication connection hole in the gear cover until permanent connection of the unit is made.

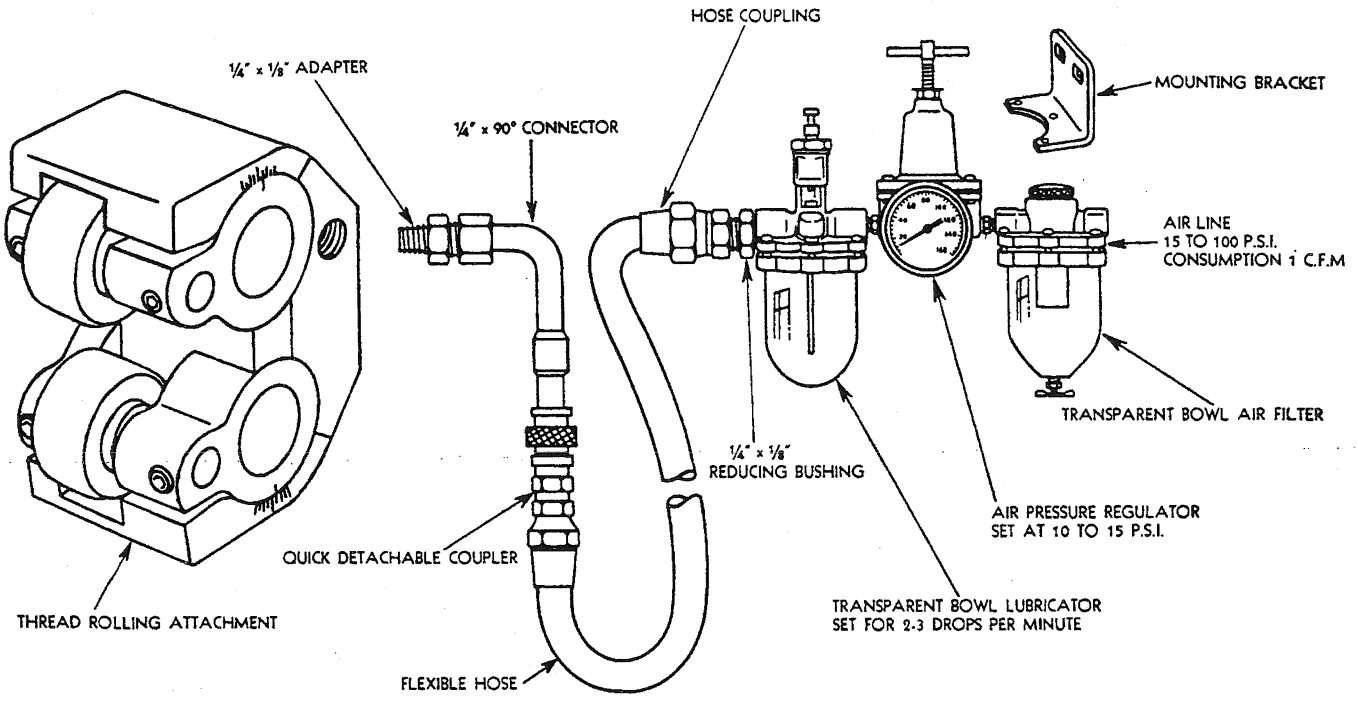


FIG. 77

Operators Check List

Problem	Probable Cause
Slivers or flakes on threads	1. Rolls not in match, or 2. Center line of rolls not parallel with center line of work, or 3. Cross slide or adapter pivot pin worn, or 4. Overfilling rolls, or 5. Material not adaptable to cold-working, or 6. Rough finish on blank, or 7. Seamy stock
Drunken threads	1. Rolls not in match, or 2. Center line of rolls not parallel with center line of work, or 3. Inaccurate rolls, or 4. Work bending during rolling.
Offsize threads	
1. Pitch diameter and major diameter, both oversize	Oversize blanks
2. Pitch diameter oversize, major diameter correct size	Oversize blanks. If finished thread is full, thread on roll is too shallow
3. Pitch diameter oversize, major diameter undersize	Insufficient squeeze on rolls. If finished thread is full, thread on roll is too shallow
4. Pitch diameter correct size, major diameter oversize	Blank too large. Thread on roll deeper than necessary
5. Pitch diameter correct size, major diameter undersize	Blank too small. If finished thread is full, thread on roll is too shallow
6. Pitch diameter undersize, major diameter oversize	Too much squeeze. Thread on roll deeper than necessary
7. Pitch diameter undersize, major diameter correct size	Blank too small. Thread on roll deeper than necessary
8. Pitch diameter and major diameter both undersize	Blank too small
Out of round thread	1. Out of round blank, or 2. Center line of rolls, not parallel with center line of work, or 3. Feed rate too high, or 4. Insufficient work revolutions, or 5. Material not ductile enough for cold-working, or 6. Not rolling to center line of work
Tapered threads	
1. Pitch diameter straight, major diameter tapered and not filled out on small end	Tapered blank
2. Pitch diameter and major diameter both tapered same way	Tapered blank and rolls set up with taper to match
3. Pitch diameter and major diameter tapered in opposite directions and thread not filled out on end with small major diameter	Rolls not squeezed tight enough on edge with large pitch diameter and small major diameter, or work bending during rolling
Thread with expanded lead	Expanded lead in rolls
Thread with contracted lead	Contracted lead in rolls
Poor thread form	1. Poor thread form in rolls, or 2. Work bending during rolling, or 3. Rolls not in match, or 4. Too many work revolutions, or 5. Excessive or restricted end travel of rolls, or 6. Center line of rolls not parallel with center line of work
Thread filled out in center, but not towards ends, or vice versa	1. Roll with varying diameter from end to end, or 2. Blank with varying diameter from end to end
Split thread—axially	1. Seamy stock, or 2. Mark from shave tool or hollow mill
Poor finish on thread	1. Correspondingly poor finish on rolls, or 2. Rolls that are worn out or broken, or 3. Overfilling rolls, or 4. Rolls not in match, or 5. Material accumulated in threads on roll, or 6. Material not ductile enough for cold-working
Crests not filled out. Many users do not consider this a serious objection and by allowing their threads to pass with crests not filled out, overloading of rolls is avoided and roll life is prolonged	1. Blank too small, or 2. Thread on roll too deep
Scuffed crests	1. Attachment not retracting fast enough, or 2. Rolls and gear train binding, or 3. Rolling beyond center line of work, or 4. Material accumulated in threads on rolls
Hollow work, hole closes in	1. Machine hole after rolling, or 2. Needs supporting mandrel, or 3. Feed rate too high, causing too rapid penetration
Hollow work, hole enlarged	1. Machine hole after rolling, or 2. Supporting mandrel too tight, or 3. Blank too large on major diameter, or 4. Feed rate too high causing too rapid penetration
Hollow work, out of round	1. Machine hole after rolling, or 2. Feed rate too high causing too rapid penetration, or 3. Too few work revolutions
Hollow work, tapered threads due to uneven wall thickness or support from adjacent section	1. Machine hole after rolling, or 2. Improper mandrel not giving support where needed, or 3. Feed rate too high causing too rapid penetration, or 4. Taper of rolls not great enough to compensate for tendency of work to taper, or 5. Too thin wall thickness

REED Standard Thread Rolls

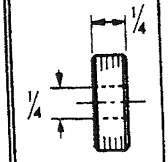
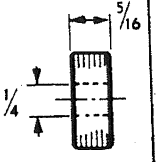
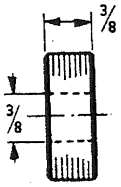
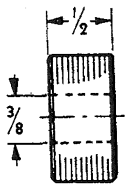
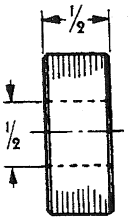
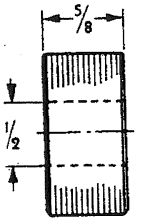
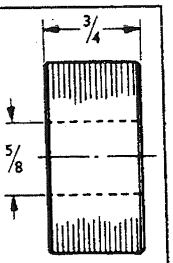
for Single Roll Application

Standardization of thread rolls by Reed for single roll applications on screw machines has been accepted enthusiastically by tool engineers, setup men and operators alike. Reed also supplies standard Brown & Sharpe holders especially designed for thread rolling and for use with Reed standard thread rolls. This provides a complete package of simple thread rolling tools of wide capacity and versatility in application for single spindle automatics.

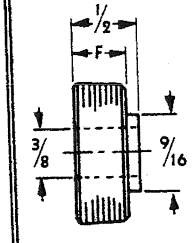
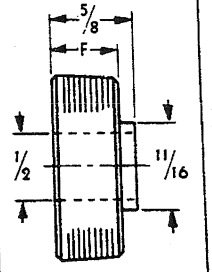
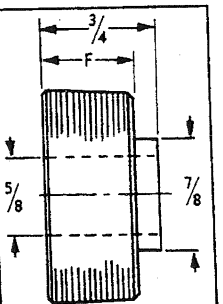
To roll uniform and accurate threads and other forms economically, it is necessary that the thread rolls used be of the highest quality, and have inherent accuracy and uniformity. It is important that the threads on the rolls be made to the correct specifications for a given job, and for this purpose Reed has available a considerable amount of authentic thread information and also has an unusual assortment of threading tools for accurately producing various thread forms and sizes of threads. Reed threading engineers give careful attention to thread and form specifications.

Reed has manufactured precision thread rolling dies and thread rolls continuously for more than half a century. During this period our organization has worked closely with the thread rolling industry and gained invaluable

REED Standard Thread Rolls for Straight Threads

THREAD ROLL	 F1-44	 F1-54	 F1-66	 F1-86	 F1-88	 F1-108	 F1-1210
USED IN BROWN & SHARPE SINGLE ROLL HOLDER	83-200	83-200	84-100 83-120	84-100 83-120	84-120 83-122	84-120 83-122	84-122

REED Standard Thread Rolls for Taper Pipe Threads

THREAD ROLL	 Y2-86	 Y2-108	 Y2-1210
USED IN BROWN & SHARPE SINGLE ROLL HOLDER	84-100 83-120	84-120 83-122	84-122
FOR TAPER PIPE SIZES	1/16 -27 1/8 -27	1/16 -27 1/8 -27 1/4 -18 3/8 -18	1/16 -27 1/8 -27 1/4 -18 3/8 -18 1/2 -14 3/4 -14

IMPORTANT

All Reed Standard Thread Rolls are furnished without bushings or needle bearings. There may be a definite advantage in applications where the machine spindle speed is comparatively high, to use rolls with bronze bushings or needle bearings. These rolls should be used when the roll speed is approximately 800-1000 r.p.m. Roll speed can be computed by dividing the machine spindle speed by the number of starts on the rolls used.

F — Working Faces of Rolls

For American Standard External Taper Pipe Threads

Pipe Size	L_2 Standard Thread Lengths	F—Working Face of Roll
1/16 -27	.261	.354
1/8 -27	.263	.357
1/4 -18	.401	.541
3/8 -18	.407	.547
1/2 -14	.533	.712
3/4 -14	.545	.724

F is equal to the standard L_2 length of the pipe thread plus 2½ pitches. It is suitable for rolling threads to the standard L_2 lengths.

experience in the design, manufacture and application of all kinds of thread rolling dies and thread rolls. The best efforts of our organization are constantly applied to thread rolling research and the proper application of our products. Reed thread rolls are continually being improved through the use of superior designs, materials and methods of manufacture and heat-treatment.

Our modern factory and heat-treating facilities, plus rigid manufacturing controls are your assurances that Reed thread rolls are produced to high standards of quality and give outstanding performance with longer life.

Although it will be necessary to continue to make special rolls for certain types of applications, Reed standard rolls have eliminated the need for many types of special rolls. Reed standardization of thread rolls has also made it possible to stock thread rolls for popular thread sizes. This results in lower tool cost and fast deliveries. In some instances users find it more economical to purchase Reed standard rolls and make slight alterations themselves to comply with special requirements.

Reed standard thread rolls are furnished with the American Standard Thread Form. Diameters of thread rolls vary with the size of thread to be rolled and the number of starts on a roll. Table 44 on page 88 shows the number of starts for different standard thread sizes from 0-80 through 1"-32 for Reed standard rolls. This table also gives the shoulder diameters permissible when using Brown & Sharpe Standard Single Thread Roll Holders or any holder that has a distance from center of pin to edge of holder, not exceeding the "G" dimension shown in Table 43.

Standard Single Roll Holders

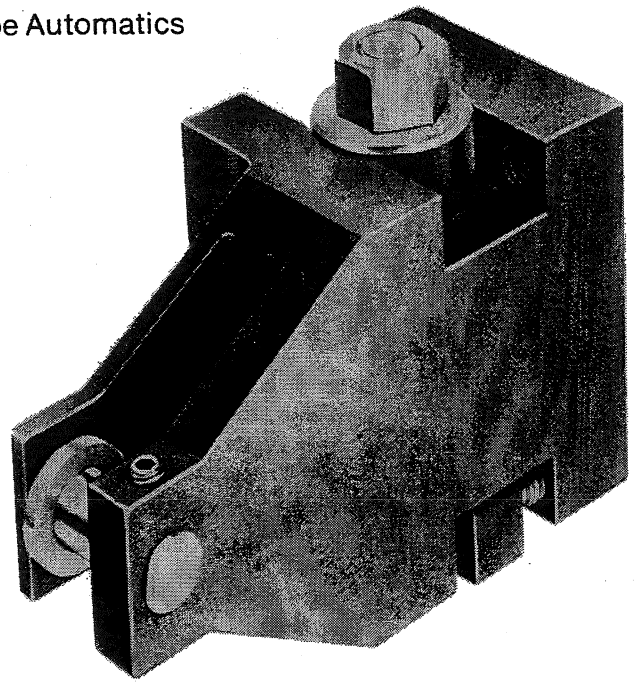
for Brown & Sharpe Automatics

Brown & Sharpe Standard Single Roll Holders are especially designed for thread rolling and are made in six different sizes to accommodate Reed Standard Thread Rolls as shown on page 84. The holders are available in two styles for each size Brown & Sharpe Machine, one for narrow and one for wide thread rolls. A spacer is supplied with holders which accommodate rolls of two different widths.

Table 40 — Brown & Sharpe Standard Single Roll Holder Capacities

Holder No.	Machines Where Used	Maximum Roll Diameter	Reed Standard Thread Rolls Used
No. 83 Holders for Narrow Rolls			
83-200	00 Auto.	1¾	F1-44, F1-54
83-120	0 Auto.	2¼	F1-66, F1-86, Y2-86
83-122	2 Auto.	2½	F1-88, F1-108, Y2-108
No. 84 Holders for Wide Rolls			
84-100	00 Auto.	1¾	F1-66, F1-86, Y2-86
84-120	0 Auto.	2¼	F1-88, F1-108, Y2-108
84-122	2 Auto.	2½	F1-1210, Y2-1210

The design of the holders includes a swivel arrangement which can be adjusted to compensate for any deflection in work caused by pressure of the rolls. The holders can be used on either front or back cross slide by merely reversing position of clamping bolt and swivel.



One of the supports for the roll pin is very narrow so that the thread roll can be used close to the collet. Rolls are mounted on long wearing carbide pins.

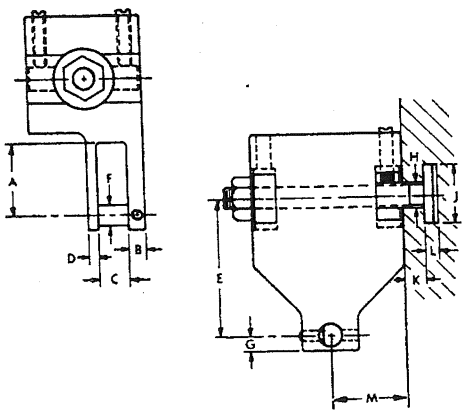
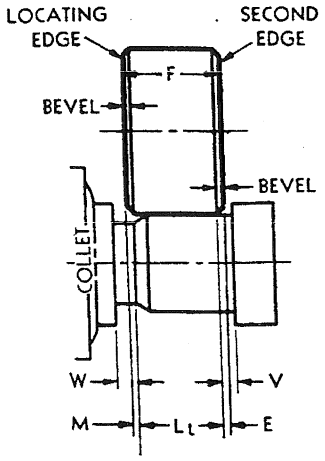


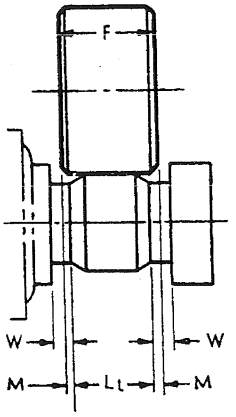
Table 41 — Dimensions of Brown & Sharpe Standard Thread Roll Holders

Holder No.	A	B	C	D	E	F	G	H	J	K	L	M
83–200	31/32	5/16	5/16	3/16	1 51/64	1/4	7/32	3/8	5/8	3/16	3/16	1
83–120	1 5/16	5/16	1/2	3/16	2 7/16	3/8	9/32	7/16	3/4	3/16	5/16	1 5/16
83–122	1 7/16	7/16	5/8	3/16	3 3/64	1/2	11/32	1/2	7/8	1/4	3/8	1 7/16
84–100	31/32	5/16	1/2	3/16	1 51/64	3/8	9/32	3/8	5/8	3/16	3/16	1
84–120	1 5/16	7/16	5/8	3/16	2 7/16	1/2	11/32	7/16	3/4	3/16	5/16	1 5/16
84–122	1 7/16	7/16	3/4	3/16	3 3/64	5/8	7/16	1/2	7/8	1/4	3/8	1 7/16

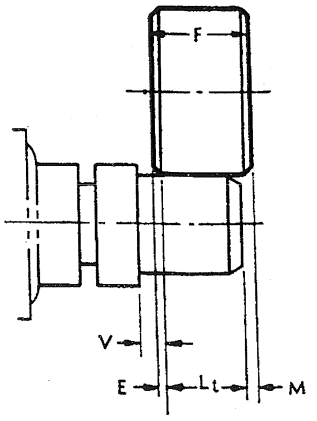
Table 42 — Positioning of Thread Rolls in Relation to Work



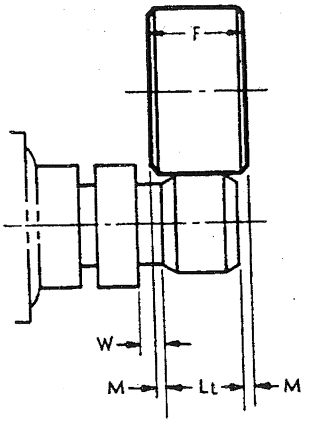
No. 1
Thread at cut-off end behind shoulder on straight blank



No. 2
Thread at cut-off end behind shoulder on blank with neck



No. 3
Thread in front of shoulder on straight blank



No. 4
Thread in front of shoulder on blank with neck

Bevels on the roll edges are determined by W or V, and based on the minimum width of neck, cut-off tool, or minimum distance from the shoulder to first complete thread. Sketches 1, 2, 3 and 4 show four basic application conditions to help determine the design of roll edge required.

W = Minimum width of cut-off tool or neck adjacent to shoulder permissible.

V = Minimum distance from shoulder to first complete thread on straight blanks.

M = Minimum distance from edge of roll to end of work.

E = Distance from roll edge to first complete thread.

L = Length of full thread on work.

*F = Working face on roll.

Note: Values of W, V, M and E in table 43.

Formulae for Finding Minimum Working Face of Roll

Sketch No.	*Working Face of Roll	
	F_1	F_2
1	$M + L_t + E$	$2(E + L_t) + p$
2	$2M + L_t$	$2(M + L_t) + p$
3	$E + L_t + M$	$2(E + L_t) + p$
4	$2M + L_t$	$2(M + L_t) + p$

*F_1 = Minimum working face of non reversible rolls used for angle setting.

*F_2 = Minimum working face of reversible rolls used for two settings.

p = Pitch of thread.

Table 43 — Values of W, V, M and E for 30°, 45°, and 60° Bevels and Machined Breakouts

Threads per Inch	†30° Bevel*				†45° Bevel*			
	W	V	M	E	W	V	M	E
80	.023	.020	.017	.014	.018	.014	.011	.008
72	.026	.023	.019	.016	.019	.016	.012	.009
64	.029	.025	.021	.018	.022	.018	.014	.010
56	.033	.029	.025	.020	.025	.021	.016	.012
48	.039	.034	.029	.023	.029	.024	.019	.014
44	.043	.037	.031	.026	.032	.026	.020	.015
40	.047	.041	.034	.028	.035	.029	.022	.016
36	.052	.045	.038	.031	.039	.032	.025	.018
32	.059	.051	.043	.035	.044	.036	.028	.020
28	.067	.058	.049	.040	.050	.041	.032	.023
27	.069	.061	.051	.042	.052	.043	.033	.024
24	.078	.068	.057	.047	.058	.048	.038	.027
20	.094	.081	.069	.056	.070	.058	.045	.033
18	.104	.090	.076	.062	.078	.064	.050	.036
16	.117	.102	.086	.070	.088	.072	.056	.041
14	.134	.116	.098	.080	.100	.082	.064	.046
13	.144	.125	.106	.087	.108	.088	.069	.050
12	.156	.135	.115	.094	.117	.096	.078	.054
11½	.163	.141	.119	.098	.122	.100	.078	.056
11	.170	.148	.125	.102	.127	.105	.082	.059
10	.188	.163	.138	.113	.140	.115	.090	.065
9	.208	.181	.153	.125	.155	.128	.100	.072
8	.234	.203	.172	.141	.175	.144	.112	.081

Threads per Inch	‡60° Bevel*				§Machined Breakouts*			
	W	V	M	E	W	V	M	E
80	.014	.011	.008	.005				
72	.016	.012	.009	.005				
64	.018	.014	.010	.006				
56	.020	.016	.011	.007				
48	.024	.018	.013	.008				
44	.026	.020	.014	.009				
40	.028	.022	.016	.009				
36	.031	.024	.017	.010				
32	.035	.027	.020	.012				
28	.040	.031	.022	.013				
27	.042	.032	.023	.014				
24	.047	.036	.026	.016				
20	.056	.044	.031	.019	.056	.044	.031	.019
18	.063	.049	.035	.021	.063	.049	.035	.021
16	.070	.055	.039	.023	.070	.055	.039	.023
14	.080	.063	.045	.027	.080	.063	.045	.027
13	.087	.067	.048	.029	.087	.067	.048	.029
12	.094	.073	.052	.031	.094	.073	.052	.031
11½	.098	.076	.054	.033	.098	.076	.054	.033
11	.102	.080	.057	.034	.102	.080	.057	.034
10	.113	.088	.063	.038	.113	.088	.063	.038
9	.125	.097	.069	.042	.125	.097	.069	.042
8	.141	.109	.078	.047	.141	.109	.078	.047

§Machined Breakouts not recommended for 24 TPI and finer.

†45° Bevels are most common on single rolls, but 30° preferred where conditions permit.

‡60° Bevels may be used at cut-off end when narrow cut-off tools are required.

*Angle of bevels on edges of rolls is measured from axis of roll.

Table 44 — Shoulder Capacity for Brown & Sharpe Standard Single Thread Roll Holders

Using Reed Standard Single Thread Rolls for American Standard External Pipe Threads

N — Number of Starts on Thread Roll B — Shoulder Diameter

THREAD SIZE		THREAD ROLL HOLDER					
		83-200	84-100	83-120	84-120	83-122	84-122
0-80	N	15	17	17	...	...	...
	B	1.240	.210	.210	...	...	...
1-64	N	13	15	15	...	...	...
	B	.280	.270	.270	...	...	...
1-72	N	13	15	15	...	...	...
	B	.310	.300	.300	...	...	...
2-56	N	11	13	13	...	...	...
	B	.300	.310	.310	...	...	...
2-64	N	11	13	13	...	...	...
	B	.330	.340	.340	...	...	...
3-48	N	9	11	11	...	...	...
	B	.260	.290	.290	...	...	...
3-56	N	9	11	11	...	...	...
	B	.290	.330	.330	...	...	...
4-40	N	8	10	10	...	...	...
	B	.260	.300	.300	...	...	...
4-48	N	8	10	10	...	...	...
	B	.300	.360	.360	...	...	...
5-40	N	7	9	9	...	...	...
	B	.280	.350	.350	...	...	...
5-44	N	7	9	9	...	...	...
	B	.300	.380	.380	...	...	...
6-32	N	7	8	8	...	...	...
	B	.330	.310	.310	...	...	...
6-40	N	7	8	8	...	...	...
	B	.380	.370	.370	...	...	...
8-32	N	6	7	7	...	...	...
	B	.400	.410	.410	...	...	...
8-36	N	6	7	7	...	...	...
	B	.430	.440	.440	...	...	...
10-24	N	6	6	6	7	7	...
	B	.510	.380	.380	.400	.400	...
10-28	N	6	6	6	7	7	...
	B	.550	.430	.430	.450	.450	...
10-32	N	6	6	6	7	7	...
	B	.590	.460	.460	.490	.490	...
10-36	N	6	6	6	7	7	...
	B	.620	.490	.490	.520	.520	...
10-40	N	6	6	6	7	7	...
	B	.640	.510	.510	.550	.550	...
10-48	N	6	6	6	7	7	...
	B	.670	.540	.540	.590	.590	...
5/16-36	N	4	4	4	5	5	6
	B	.910	.780	.780	.940	.940	1.030
5/16-40	N	4	4	4	5	5	6
	B	.920	.800	.800	.960	.960	1.060
5/16-48	N	4	4	4	5	5	6
	B	.940	.820	.820	.980	.980	1.090
3/8-16	N	4	4	4	4	4	5
	B	1.030	.900	.900	.780	.780	.900
3/8-18	N	4	4	4	4	4	5
	B	1.060	.940	.940	.810	.810	.940
3/8-20	N	4	4	4	4	4	5
	B	1.100	.970	.970	.850	.850	.980

THREAD SIZE		THREAD ROLL HOLDER					
		83-200	84-100	83-120	84-120	83-122	84-122
10-56	N	6	6	6	7	7	...
	B	.690	.570	.570	.610	.610	...
12-24	N	5	5	5	6	6	...
	B	.520	.390	.390	.440	.440	...
12-28	N	5	5	5	6	6	...
	B	.560	.430	.430	.480	.480	...
12-32	N	5	5	5	6	6	...
	B	.590	.460	.460	.520	.520	...
12-36	N	5	5	5	6	6	...
	B	.610	.490	.490	.550	.550	...
12-40	N	5	5	5	6	6	...
	B	.630	.500	.500	.570	.570	...
12-48	N	5	5	5	6	6	...
	B	.660	.530	.530	.600	.600	...
12-56	N	5	5	5	6	6	...
	B	.680	.550	.550	.620	.620	...
1/4-20	N	5	5	5	6	6	7
	B	.670	.540	.540	.610	.610	.620
1/4-24	N	5	5	5	6	6	7
	B	.720	.600	.600	.680	.680	.690
1/4-28	N	5	5	5	6	6	7
	B	.760	.640	.640	.720	.720	.750
1/4-32	N	5	5	5	6	6	7
	B	.790	.670	.670	.760	.760	.790
1/4-36	N	5	5	5	6	6	7
	B	.810	.690	.690	.780	.780	.820
1/4-40	N	5	5	5	6	6	7
	B	.830	.710	.710	.810	.810	.840
1/4-48	N	5	5	5	6	6	7
	B	.860	.740	.740	.840	.840	.880
1/4-56	N	5	5	5	6	6	7
	B	.880	.760	.760	.860	.860	.900
5/16-18	N	4	4	4	5	5	6
	B	.750	.630	.630	.750	.750	.820
5/16-20	N	4	4	4	5	5	6
	B	.780	.660	.660	.790	.790	.860
5/16-24	N	4	4	4	5	5	6
	B	.830	.700	.700	.850	.850	.930
5/16-28	N	4	4	4	5	5	6
	B	.860	.740	.740	.890	.890	.970
5/16-32	N	4	4	4	5	5	6
	B	.890	.760	.760	.920	.920	1.010
5/8-11	N	...	3	3	3	3	3
	B	...	1.460	1.460	1.340	1.340	1.150
5/8-12	N	...	3	3	3	3	3
	B	...	1.500	1.500	1.380	1.380	1.190
5/8-14	N	...	3	3	3	3	3
	B	...	1.550	1.550	1.400	1.400	1.210
5/8-16	N	...	3	3	3	3	3
	B	...	1.590	1.590	1.470	1.470	1.280
5/8-18	N	...	3	3	3	3	3
	B	...	1.630	1.630	1.500	1.500	1.310
5/8-20	N	...	3	3	3	3	3
	B	...	1.650	1.650	1.530	1.530	1.340
5/8-24	N	...	3	3	3	3	3
	B	...	1.690	1.690	1.560	1.560	1.370

Table 44 — Shoulder Capacity for Brown & Sharpe Standard Single Thread Roll Holders (Continued)

Using Reed Standard Single Thread Rolls for American Standard External Pipe Threads (Continued)

N — Number of Starts on Thread Roll B — Shoulder Diameter

THREAD SIZE		THREAD ROLL HOLDER					
		83-200	84-100	83-120	84-120	83-122	84-122
3/8-24	N	4	4	4	4	4	5
	B	1.140	1.020	1.020	.890	.890	1.030
3/8-28	N	4	4	4	4	4	5
	B	1.180	1.050	1.050	.930	.930	1.070
3/8-32	N	4	4	4	4	4	5
	B	1.200	1.080	1.080	.950	.950	1.100
3/8-32	N	4	4	4	4	4	5
	B	1.220	1.100	1.100	.970	.970	1.130
3/8-40	N	4	4	4	4	4	5
	B	1.240	1.110	1.110	.990	.990	1.150
7/16-14	N	3	3	3	4	4	4
	B	.930	.800	.800	1.040	1.040	.850
7/16-16	N	3	3	3	4	4	4
	B	.970	.840	.840	1.090	1.090	.900
7/16-18	N	3	3	3	4	4	4
	B	1.000	.870	.870	1.130	1.130	.940
7/16-20	N	3	3	3	4	4	4
	B	1.030	.900	.900	1.160	1.160	.970
7/16-24	N	3	3	3	4	4	4
	B	1.060	.940	.940	1.200	1.200	1.020
7/16-28	N	3	3	3	4	4	4
	B	1.090	.960	.960	1.240	1.240	1.050
7/16-32	N	3	3	3	4	4	4
	B	1.110	.980	.980	1.260	1.260	1.080
1/2-12	N	3	3	3	3	3	4
	B	1.130	1.000	1.000	.880	.880	1.100
1/2-13	N	3	3	3	3	3	4
	B	1.160	1.030	1.030	.900	.900	1.130
1/2-14	N	3	3	3	3	3	4
	B	1.180	1.050	1.050	.930	.930	1.160
1/2-16	N	3	3	3	3	3	4
	B	1.220	1.090	1.090	.970	.970	1.210
1/2-18	N	3	3	3	3	3	4
	B	1.250	1.110	1.110	.990	.990	1.250
1/2-20	N	3	3	3	3	3	4
	B	1.280	1.150	1.150	1.030	1.030	1.280
1/2-24	N	3	3	3	3	3	4
	B	1.310	1.190	1.190	1.060	1.060	1.330
1/2-28	N	3	3	3	3	3	4
	B	1.340	1.210	1.210	1.090	1.090	1.360
1/2-32	N	3	3	3	3	3	4
	B	1.360	1.230	1.230	1.110	1.110	1.390
9/16-13	N	...	3	3	3	3	3
	B	...	1.250	1.250	1.130	1.130	.940
9/16-14	N	...	3	3	3	3	3
	B	...	1.310	1.310	1.180	1.180	.990
9/16-16	N	...	3	3	3	3	3
	B	...	1.340	1.340	1.220	1.220	1.030
9/16-18	N	...	3	3	3	3	3
	B	...	1.380	1.380	1.250	1.250	1.060
9/16-20	N	...	3	3	3	3	3
	B	...	1.400	1.400	1.280	1.280	1.090
9/16-24	N	...	3	3	3	3	3
	B	...	1.440	1.440	1.310	1.310	1.120
9/16-28	N	...	3	3	3	3	3
	B	...	1.460	1.460	1.340	1.340	1.150
9/16-32	N	...	3	3	3	3	3
	B	...	1.480	1.480	1.360	1.360	1.170

THREAD SIZE		THREAD ROLL HOLDER					
		83-200	84-100	83-120	84-120	83-122	84-122
5/8-28	N	...	3	3	3	3	3
	B	...	1.710	1.710	1.590	1.590	1.400
5/8-32	N	...	3	3	3	3	3
	B	...	1.740	1.740	1.610	1.610	1.420
11/16-12	N	...	2	2	2	2	3
	B	...	1.150	1.150	1.030	1.030	1.440
11/16-24	N	...	2	2	2	2	3
	B	...	1.300	1.300	1.170	1.170	1.620
3/4-14	N	...	2	2	2	2	3
	B	...	1.380	1.380	1.260	1.260	1.740
3/4-16	N	...	2	2	2	2	3
	B	...	1.410	1.410	1.290	1.290	1.780
3/4-18	N	...	2	2	2	2	3
	B	...	1.440	1.440	1.310	1.310	1.810
3/4-20	N	...	2	2	2	2	3
	B	...	1.460	1.460	1.330	1.330	1.840
3/4-24	N	...	2	2	2	2	3
	B	...	1.480	1.480	1.360	1.360	1.870
3/4-28	N	...	2	2	2	2	3
	B	...	1.500	1.500	1.380	1.380	1.900
3/4-32	N	...	2	2	2	2	3
	B	...	1.520	1.520	1.390	1.390	1.910
3/16-20	N	...	...	...	2	2	2
	B	...	...	...	1.470	1.470	1.290
13/16-20	N	...	...	...	2	2	2
	B	...	...	...	1.520	1.520	1.330
7/8-14	N	...	...	...	2	2	2
	B	...	...	...	1.630	1.630	1.440
7/8-16	N	...	...	...	2	2	2
	B	...	...	...	1.660	1.660	1.470
7/8-18	N	...	...	...	2	2	2
	B	...	...	...	1.690	1.690	1.500
7/8-20	N	...	...	...	2	2	2
	B	...	...	...	1.700	1.700	1.520
7/8-24	N	...	...	...	2	2	2
	B	...	...	...	1.730	1.730	1.550
7/8-28	N	...	...	...	2	2	2
	B	...	...	...	1.750	1.750	1.570
7/8-32	N	...	...	...	2	2	2
	B	...	...	...	1.770	1.770	1.580
15/16-16	N	...	...	...	2	2	2
	B	...	...	...	1.850	1.850	1.660
15/16-20	N	...	...	...	2	2	2
	B	...	...	...	1.890	1.890	1.710
1-16	N	...	...	...	2	2	2
	B	...	...	...	2.040	2.040	1.850
1-18	N	...	...	...	2	2	2
	B	...	...	...	2.060	2.060	1.870
1-20	N	...	...	...	2	2	2
	B	...	...	...	2.080	2.080	1.890
1-24	N	...	...	...	2	2	2
	B	...	...	...	2.110	2.110	1.920
1-28	N	...	...	...	2	2	2
	B	...	...	...	2.130	2.130	1.940
1-32	N	...	...	...	2	2	2
	B	...	...	...	2.140	2.140	1.960

Table 45 — Shoulder Capacity for Brown & Sharpe Standard Single Thread Roll Holders

Using Reed Standard Single Thread Rolls for Unified and American External Screw Threads

When reviewing any application, it is important to consider the material and length of thread to be rolled as well as the thread diameter and threads per inch. All of these elements contribute to the total pressure developed during rolling which, if excessive, may cause deflection of the work or undue wear of the machine.

Although the table includes a wide range of thread sizes, it is important to note that the full range of sizes applies only to softer materials such as aluminum and brass of limited lengths. The capacity of the machine and the rigidity of the work determine the thread sizes that can be rolled in steel. Questions relative to the machine capacities should be referred to the machine manufacturer.

This table gives the shoulder diameter capacities of Brown & Sharpe Standard Holders using Reed standard rolls with the number of starts indicated. The shoulder diameter capacities also apply to any holder having the same "G" dimension. Reed standard rolls are furnished with the number of starts shown below, and if more shoulder diameter capacity is required, special rolls can be furnished of larger diameters with additional starts.

Shoulder Capacity for Brown & Sharpe Standard Single Thread Roll Holders

Using Reed Standard Single Thread Rolls for American Standard External Pipe Threads

The range of sizes of pipe threads shown for the different holders is for soft materials such as aluminum and brass. The capacity of the machine and the rigidity of the work determine the thread sizes that can be rolled on steel. Questions relative to the machine capacities should be referred to the machine manufacturer.

This table gives the shoulder diameter capacities of Brown & Sharpe Standard Holders using Reed standard rolls with the number of starts indicated. The shoulder diameter capacities also apply to any holder having the same "G" dimension. Reed standard rolls are furnished with the number of starts shown, and if more shoulder diameter capacity is required, special rolls can be furnished of larger diameters with additional starts.

N—Number of Starts on Thread Roll
B—Shoulder Diameter

Pipe Size		Thread Roll Holder		
		84–100 83–120	84–120 83–122	84–122
1/16–27	N	4	5	6
	B	.680	.820	.900
1/8–27	N	3	4	4
	B	.790	1.020	.830
1/4–18	N	....	3	3
	B	....	1.100	.910
3/8–18	N	....	....	3
	B	....	....	1.450
1/2–14	N	....	....	2
	B	....	....	1.270
3/4–14	N	....	....	2
	B	....	....	1.900

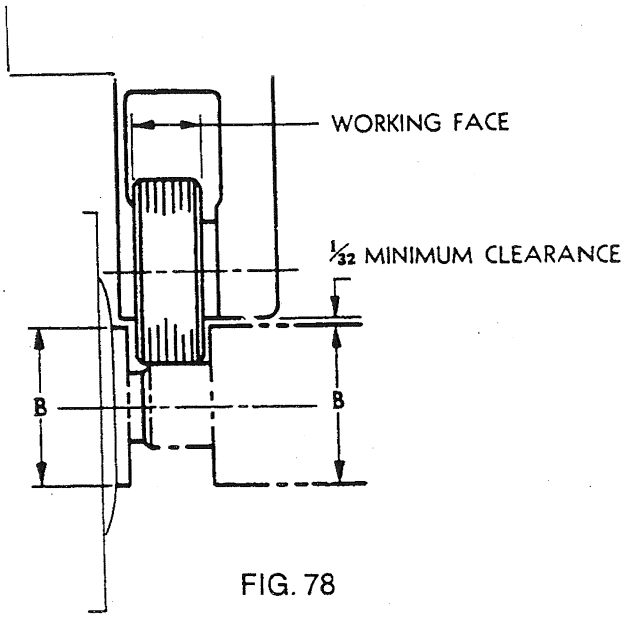
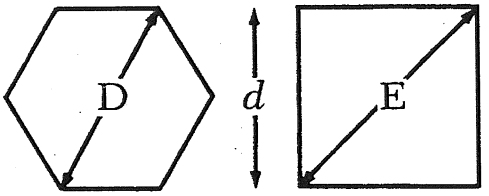


FIG. 78

Table 46 — Distance Across Corners of Squares and Hexagons



$D = 1.1547\,d$

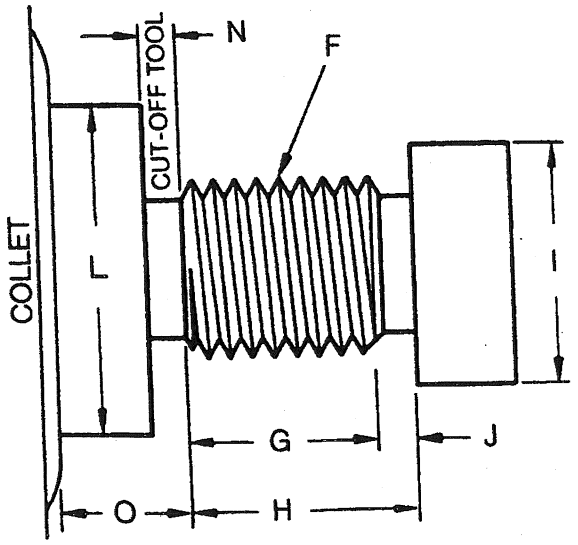
$E = 1.4142\,d$

d	D	E	d	D	E
1/4	0.2886	0.3535	1 1/4	1.4434	1.7677
9/32	0.3247	0.3977	1 9/32	1.4794	1.8119
5/16	0.3608	0.4419	1 5/16	1.5155	1.8561
11/32	0.3968	0.4861	1 11/32	1.5516	1.9003
3/8	0.4329	0.5303	1 3/8	1.5877	1.9445
13/32	0.4690	0.5745	1 13/32	1.6238	1.9887
7/16	0.5051	0.6187	1 7/16	1.6598	2.0329
15/32	0.5412	0.6629	1 15/32	1.6959	2.0771
1/2	0.5773	0.7071	1 1/2	1.7320	2.1213
17/32	0.6133	0.7513	1 17/32	1.7681	2.1655
9/16	0.6494	0.7955	1 9/16	1.8042	2.2097
19/32	0.6855	0.8397	1 19/32	1.8403	2.2539
5/8	0.7216	0.8839	1 5/8	1.8764	2.2981
21/32	0.7576	0.9281	1 21/32	1.9124	2.3423
11/16	0.7937	0.9723	1 11/16	1.9485	2.3865
23/32	0.8298	1.0164	1 23/32	1.9846	2.4306
3/4	0.8659	1.0606	1 3/4	2.0207	2.4748
25/32	0.9020	1.1048	1 25/32	2.0568	2.5190
13/16	0.9380	1.1490	1 13/16	2.0929	2.5632
27/32	0.9741	1.1932	1 27/32	2.1289	2.6074
7/8	1.0102	1.2374	1 7/8	2.1650	2.6516
29/32	1.0463	1.2816	1 29/32	2.2011	2.6958
15/16	1.0824	1.3258	1 15/16	2.2372	2.7400
31/32	1.1184	1.3700	1 31/32	2.2733	2.7842
1	1.1547	1.4142	2	2.3094	2.8284
1 1/32	1.1907	1.4584	2 1/32	2.3453	2.8726
1 1/16	1.2268	1.5026	2 1/16	2.3815	2.9168
1 3/32	1.2629	1.5468	2 3/32	2.4176	2.9610
1 1/8	1.2990	1.5910	2 1/8	2.4537	3.0052
1 5/32	1.3351	1.6352	2 5/32	2.4898	3.0494
1 3/16	1.3712	1.6793	2 3/16	2.5259	3.0936
1 7/32	1.4073	1.7235	2 1/4	2.5981	3.1820

How to Order Reed Thread Rolling Attachments

When ordering or requesting a quotation for a Reed Thread Rolling Attachment, please furnish the following information:

1. Machine
   - A. Make
   - B. Size
   - C. Model
   - D. Serial number
   - E. Rolling position
2. Work Specification
   - F. Thread size
   - G. Thread Length
   - H. Position of shoulder on work
   - I. Size of shoulder on work
   - J. Distance to first full thread
   - K. Material



3. Setup and Application Requirements
   - L. Stock size
   - M. Cut-off end of work
   - N. Width of cut-off tool
   - O. Position of threaded section in relation to collet face
   - P. Spindle speed
4. Head Size (selected from tables 1 through 9, pages 12 through 26)
5. Adapter Number (selected from tables 1 through 9)
6. Type of Roll (selected from Figs. 39 through 53, pages 51 to 55)

Reed Thread Rolls

Reed thread rolls are produced to high standards of quality and give outstanding performance with longer life. Reed makes special thread rolls for all types of holders and has an unusual assortment of threading tools for accurately producing various threads and other types of special forms. Reed threading engineers give careful attention to thread and form specifications.

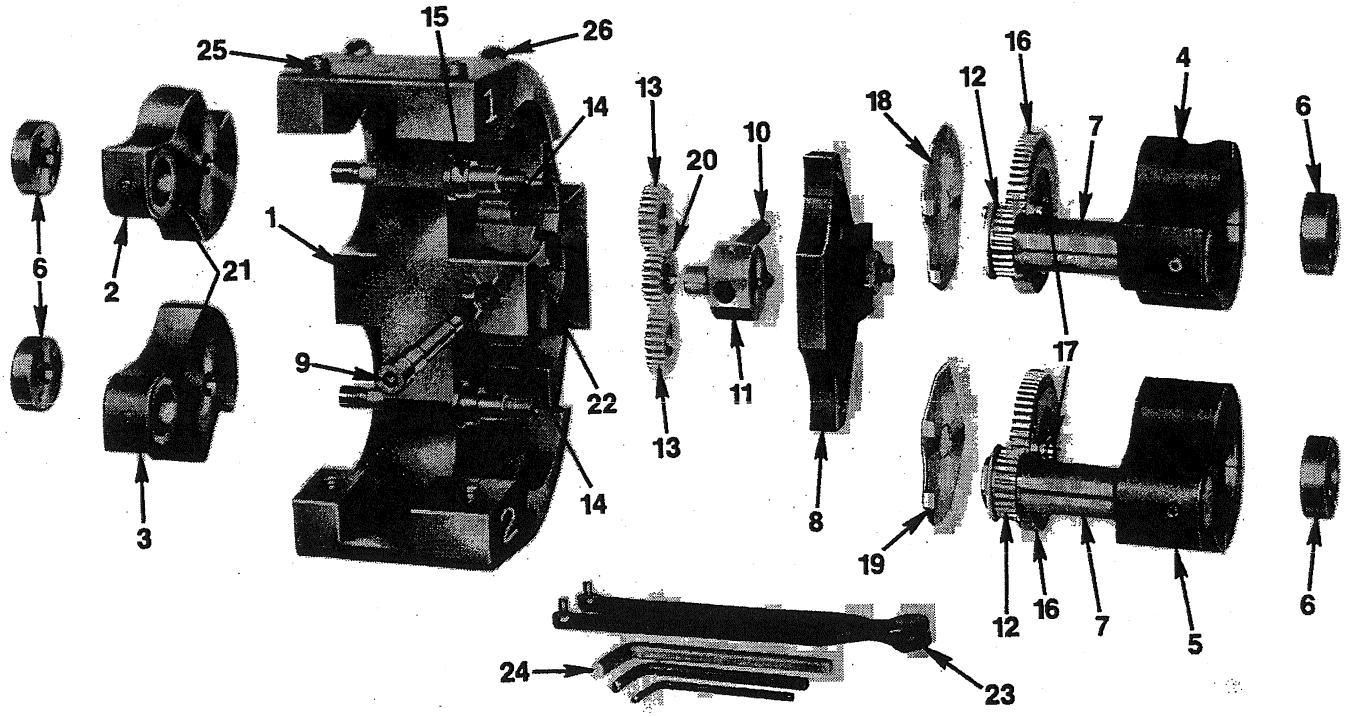
When ordering thread rolls only for the Reed Thread Rolling Attachments, please furnish the information required in **2, 3, 4, 6** *and always furnish serial number of head.*

PARTS LIST

Reed Thread Rolling Attachments

B8 - B10 - B13 - B18 - B36

IMPORTANT: When ordering parts, always furnish size and serial number of attachment.



SYMBOL NO.	PART NAME
1	Head Body
2	#1 Solid Arm (incl. bearing)
3	#2 Solid Arm (incl. bearing)
4	#1 Geared Arm (incl. spacer & bearing)
5	#2 Geared Arm (incl. spacer & bearing)
6	Arm Clamping Nut
7	Roll Pin-(specify carbide or bronze)
8	Cover Plate
9	Matching Adjustment Screw
10	Compensator Spring
11	Compensator Block
12	Drive Gear
13	Intermediate Gear
14	Gear Stud
15	Arm Pivot Shaft

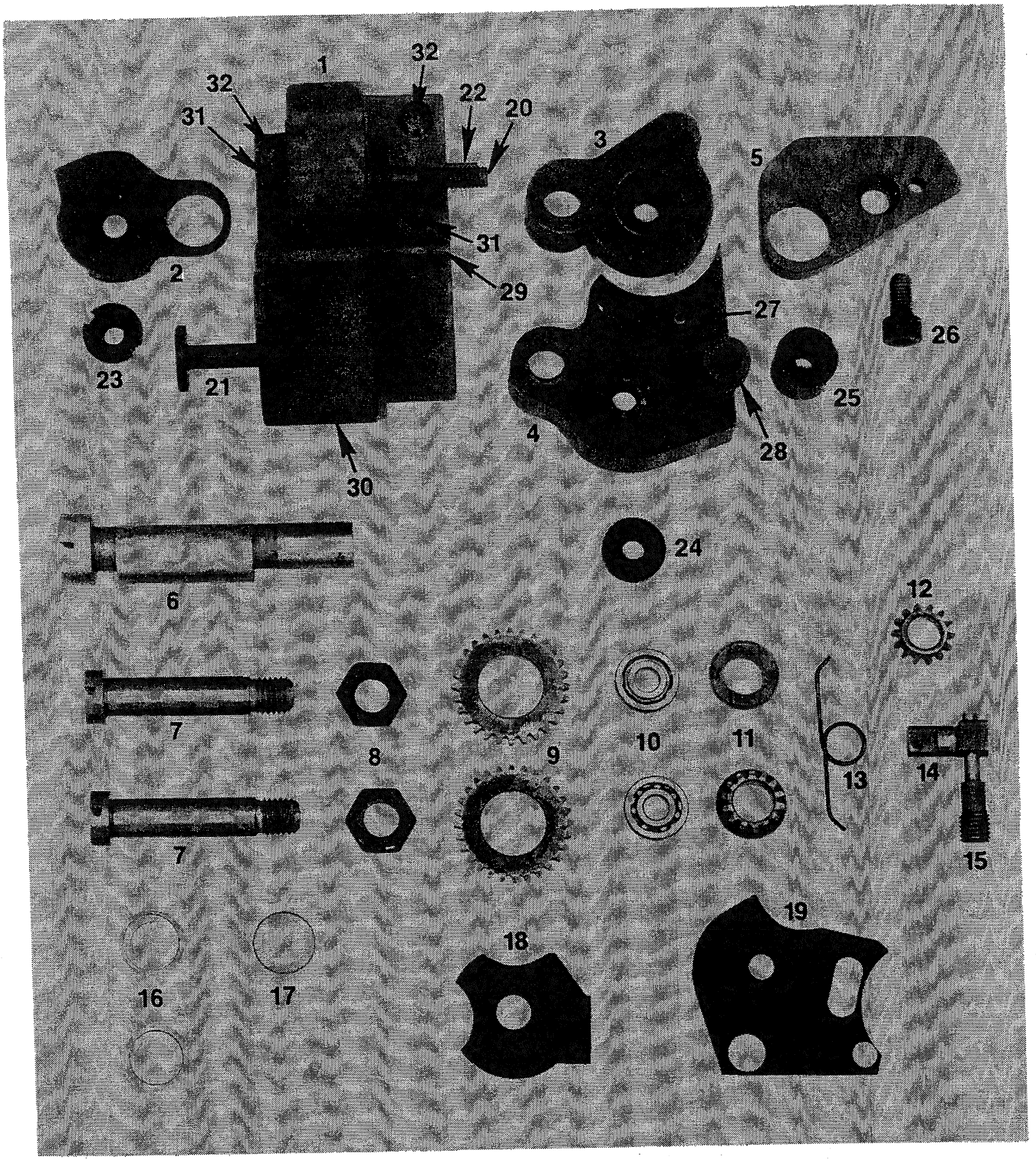
SYMBOL NO.	PART NAME
16	Large Idler Gear
17	Idler Gear Bearing
18	#1 Chip Guard
19	#2 Chip Guard
20	Compensator Gear
21A	Thrust Bearing (anti-friction)*
21B	Thrust Washer (carbide)-optional*
22	Locking Screw
23	Spanner Wrench
24	Hex Wrenches (Set)
25	Arm Adjusting Screw
26	Arm Locking Screw
27	Bronze Thrust Bushing-not shown (for geared arm-obsolete)*
28A	#1 Roll Gap Spacer-1 notch-not shown*
28B	#2 Roll Gap Spacer-2 notches-not shown*

*see pages 71 & 72 for details

PARTS LIST

Reed B5 Thread Rolling Attachment

IMPORTANT: When ordering parts, always furnish size and serial number of attachment.



SYMBOL NO.	PART NAME
1	Head Body
2	Solid Arm
3	Geared Arm
4	Cover
5	Geared Arm Clamp
6	Eccentric Pivot Pin
7	Roll Pin
8	Roll Pin Locknut
9	Idler Gear
10	Idler Gear Bearing
11	Drive Gear
12	Compensator Gear
13	Torsion Spring
14	Compensator Block
15	Matching Adjustment Screw
16	Thrust Bearing
17	Carbide Thrust Washer
18	#1 Chip Guard
19	#2 Chip Guard
20	Pivot Shaft
21	Pivot Bolt
22	1/8" Allen Dowel Pin
23	Tapered Clamping Nut
24	Thin Clamping Nut
25	Thick Clamping Nut
26	#10-32 UNF x 3/8 lg. Soc. Hd. Cap Screw
27	Locking Screw, #5-40 UNC x 3/16 lg. Cup. Pt. Soc. Set Screw
28	1/4-28 NF x 1-1/8 lg. Soc. Hd. Cap Screw
29	.156 x 1 1/4 Drill Rod
30	1/4-28 UNF x 1" lg. Soc. Hd. Cap Screw
31	Arm Locking Screw, #10-32 UNF x 1" lg. Oval Pt. Soc. Set Screw
32	Arm Adjusting Screw, 1/4-28 UNF x 3/4 lg. Oval Pt. Soc. Set Screw

Not Shown — Screw Driver, Allen Hex Keys — 1/16, 3/32, 1/8 & 3/16

NOTES

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