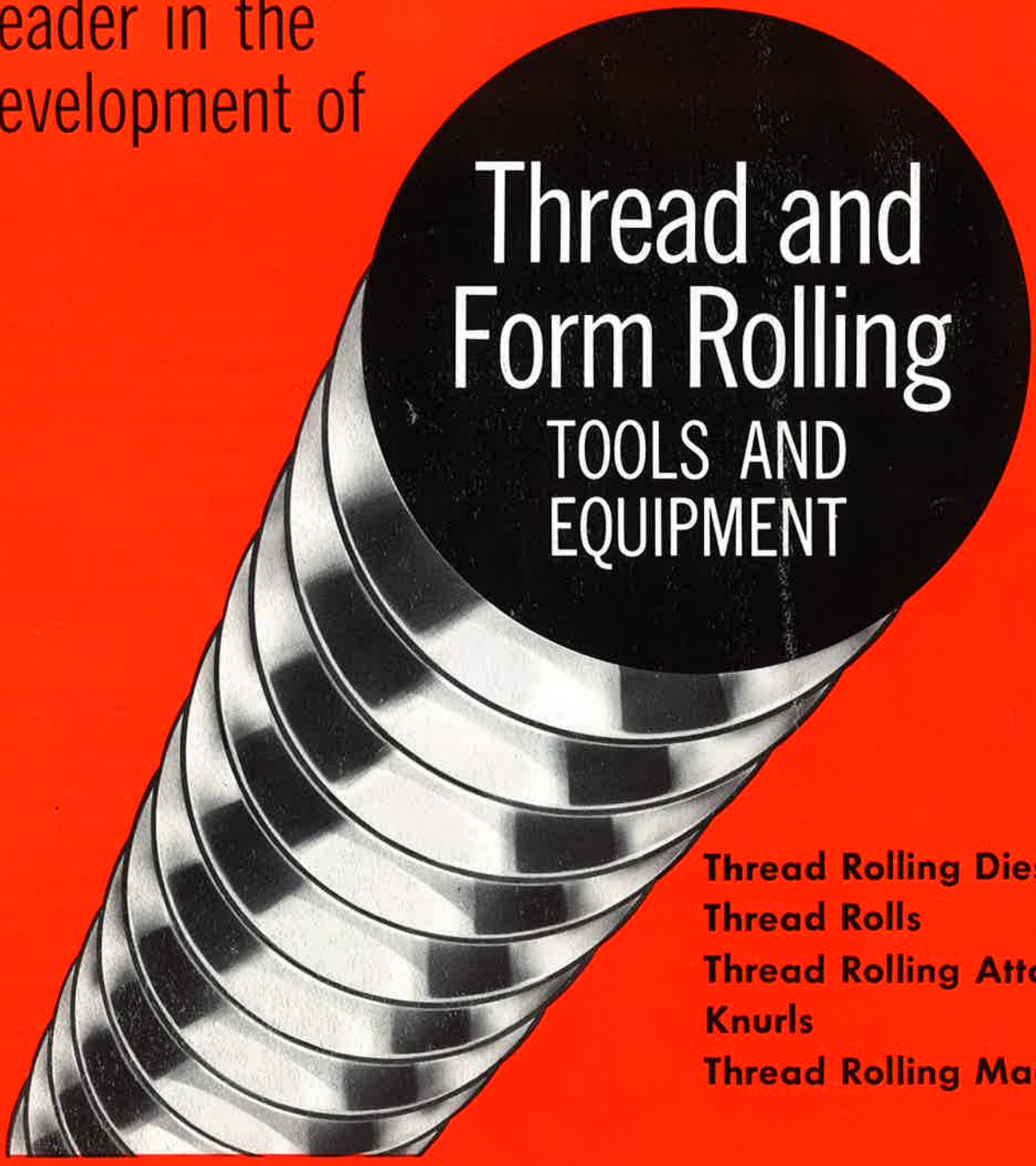
REED

Leader in the development of

Thread and Form Rolling
TOOLS AND EQUIPMENT



Thread Rolling Dies
Thread Rolls
Thread Rolling Attachments
Knurls
Thread Rolling Machines

Litton
REED
Holden, Mass. 01520 U.S.A.

Thread Rolling TOOLS

Flat Dies

Planetary Dies

Cylindrical Dies

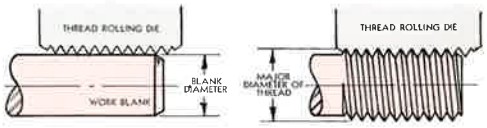
Thread Rolls

Knurls

Thread Rolling Process

Thread rolling is a chipless cold forming process. A plain cylindrical blank, with a diameter part way between the major and minor diameters of the finished thread, is rotated and squeezed between hardened steel dies whose working surfaces are the reverse of the thread form to be produced. The threads of the die penetrate the surface of the blank as it rolls between them, displacing material to form the roots of the threads, and forcing the displaced material radially outward to form the crests. Unlike other threading processes, no material is wasted.

The rolling dies may be either flat or cylindrical. Flat dies mounted in reciprocating type machines have long been



used for threading by the fastener industry. More recently, planetary machines are being used. Cylindrical dies mounted in rotary type thread rolling machines, and thread rolling attachments used in automatic screw machines and automatic lathes have gained widespread use for threading special fasteners and component parts. Cylindrical dies used in screw machines and automatic lathes are commonly referred to as thread rolls.

Most threads are rolled by the in-feed method in which the entire thread length is formed simultaneously without axial movement of the part. Threads that are too long to be produced by the in-feed method can, however, be rolled by a thru-feed method on cylindrical die type machines.

History and Development

For over 55 years our major efforts have been devoted to developing the thread rolling process and designing and building thread rolling tools and equipment.

Although the thread rolling process was known early in the nineteenth century, widespread knowledge and use is relatively new. The extruding process, for the production of blanks with full-sized bodies and ends reduced to rolling diameter, was developed during the 20's, making possible the economical production of bolts with uniform diameter of body and thread. The use of tungsten carbide in wire drawing, heading and extruding dies, that became prevalent in the 30's, made possible closer tolerances. Thread rolling machines were made heavier and more reliable, thread rolling dies were developed with greater accuracy, and operating techniques were steadily improved.

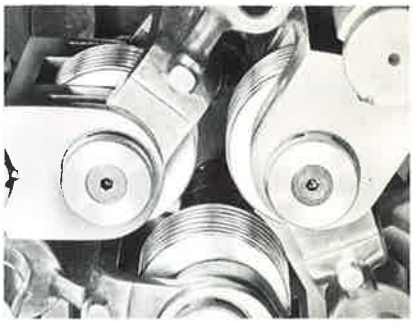
SPECIALISTS IN THREAD AND FORM ROLLING TOOLS AND EQUIPMENT FOR OVER 50 YEARS

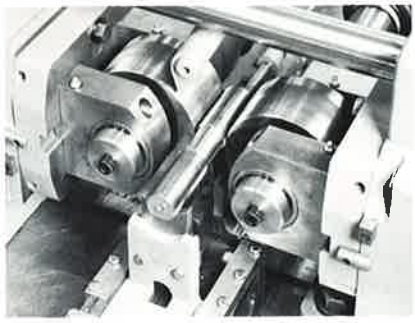
The development of Reed Cylindrical Die Machines in the early 40's provided greater ease in obtaining accurate threads on precision fasteners, and expanded the application of thread rolling to all types of component parts.

Reed is constantly developing new types of thread rolling tools and equipment. The thread rolling process is daily finding new applications where its speed, accuracy, uniformity and strength adds to the parts rolled, can be used to reduce costs and improve the quality of an endless number of threaded parts.

Thread Rolling EQUIPMENT

3 DIE TYPE
in-feed/thru-feed

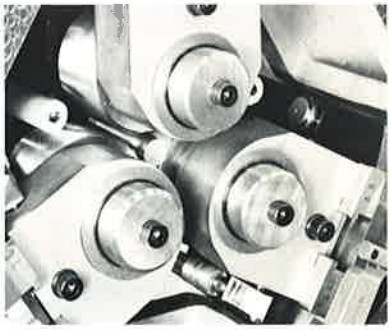


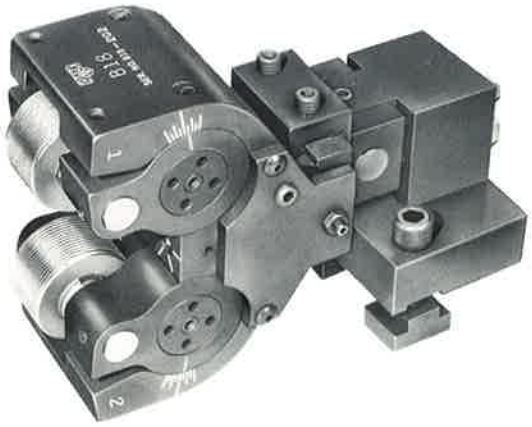


2 DIE TYPE
in-feed/thru-feed

Thread and Form Rolling Machines

3 DIE TYPE
thru-feed





Thread Rolling Attachments

for bar automatics
and automatic lathes

End Rolling Heads

for rotating
or non-rotating applications

Thread Rolling Tools

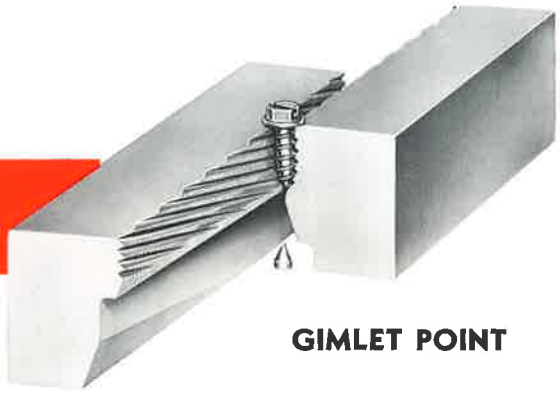
For many years we have been a leading manufacturer of thread rolling dies and have worked closely with the fastener industry to broaden the application of thread and form rolling. Our close relationship with their requirements has been of inestimable value in the development and continued improvement of Reed thread rolling dies for use on flat type reciprocating thread rolling machines and planetary dies for use on rotary planetary machines.

The precise control of die dimensions and carefully matched threads of the correct lead angle on a pair of Reed dies assures quick and accurate setup. This results in the production of uniformly accurate threads with reduced down time and superior die life. It is well to remember that even though the threads to be rolled do not necessarily have to be held to close limits, precision-made dies are always more economical to use.

It is important that threads on dies be made to the correct specifications for a given job. Reed maintains a considerable amount of authentic thread information and an unusual assortment of threading tools for accurately producing various thread forms and sizes of threads.

FLAT DIES

DUPLEX FACE



GIMLET POINT

SINGLE FACE

PLANETARY DIES

CYLINDRICAL DIES

Reed Cylindrical Dies are furnished for ALL MAKES OF THREAD ROLLING MACHINES using cylindrical dies. Since the thread form on a set of dies is faithfully reproduced on the parts, and does not change appreciably during the entire life of the dies, the success of thread rolling in any machine is largely dependent on the quality of the dies used.

The design of dies is selected to meet the specific requirements of each application for either in-feed or thru-feed rolling. Manufactured to the precise tolerances required for proper fit to the die holders

MORE CAN BE DONE

used in Reed Machines, they produce accurate, uniform threads and forms with outstanding performance and long life.

Reed has many years of experience in the application of cylindrical dies as a pioneer leader in the field of cylindrical die thread rolling and is familiar with the requirements of all types of thread and form rolling equipment. Dies for all makes of Cylindrical Thread Rolling Machines are designed and manufactured under rigid standards to produce better threaded products with improved performance and reduced operating costs.

IN-FEED
3 DIES

THRU-FEED
3 DIES

IN-FEED
2 DIES

THRU-FEED
2 DIES

THREAD ROLLS

FOR REED THREAD ROLLING ATTACHMENTS

MORE CAN BE DONE

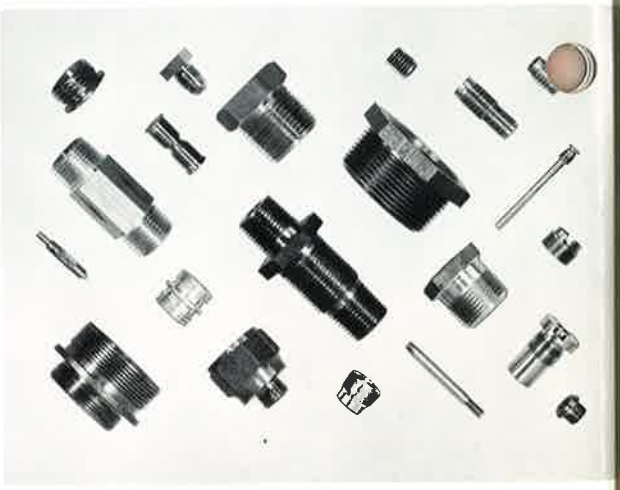
STANDARDIZED ROLLS FOR SINGLE ROLL APPLICATIONS

FOR ALL TYPES OF ATTACHMENTS AND HOLDERS

Thread Rolling Tools

To economically roll uniform accurate threads on bar automatics with thread rolling attachments and holders, the rolls used must be of proper design to meet the specific requirements of each application. Rolls must also meet the highest standards of quality and have inherent accuracy and uniformity.

Reed has manufactured precision thread rolls for over fifty years. The experience gained during this period has resulted in the development of precise methods for computing the correct diameter of roll to assure maximum performance. Reed has available a considerable amount of authentic thread information and also an unusual assortment of threading tools for accurately producing various thread forms and sizes of threads to meet the correct specifications for a given job.



Reed PREMATCHED THREAD ROLLS assure outstanding performance of Reed Attachments. Operators find them easy to set up and since they are manufactured to the precise tolerances required and for proper fit to the attachment, longer life is achieved with less machine down time and better quality threads.

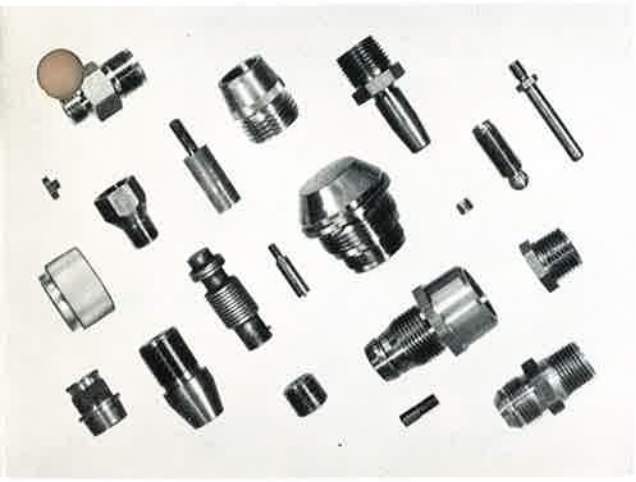
Reed STANDARDIZED THREAD ROLLS for single roll applications has eliminated the need for many types of

special rolls. This standardization has been accepted enthusiastically by tool engineers, setup men and operators since it has resulted in lower tool costs and immediate availability of rolls for popular thread sizes.

Reed is familiar with the requirements of all types of thread rolling equipment. Thread rolls for ALL TYPES AND MAKES OF THREAD ROLLING ATTACHMENTS AND HOLDERS are designed and manufactured to rigid standards to produce better threaded products with improved performance and reduced operating cost.

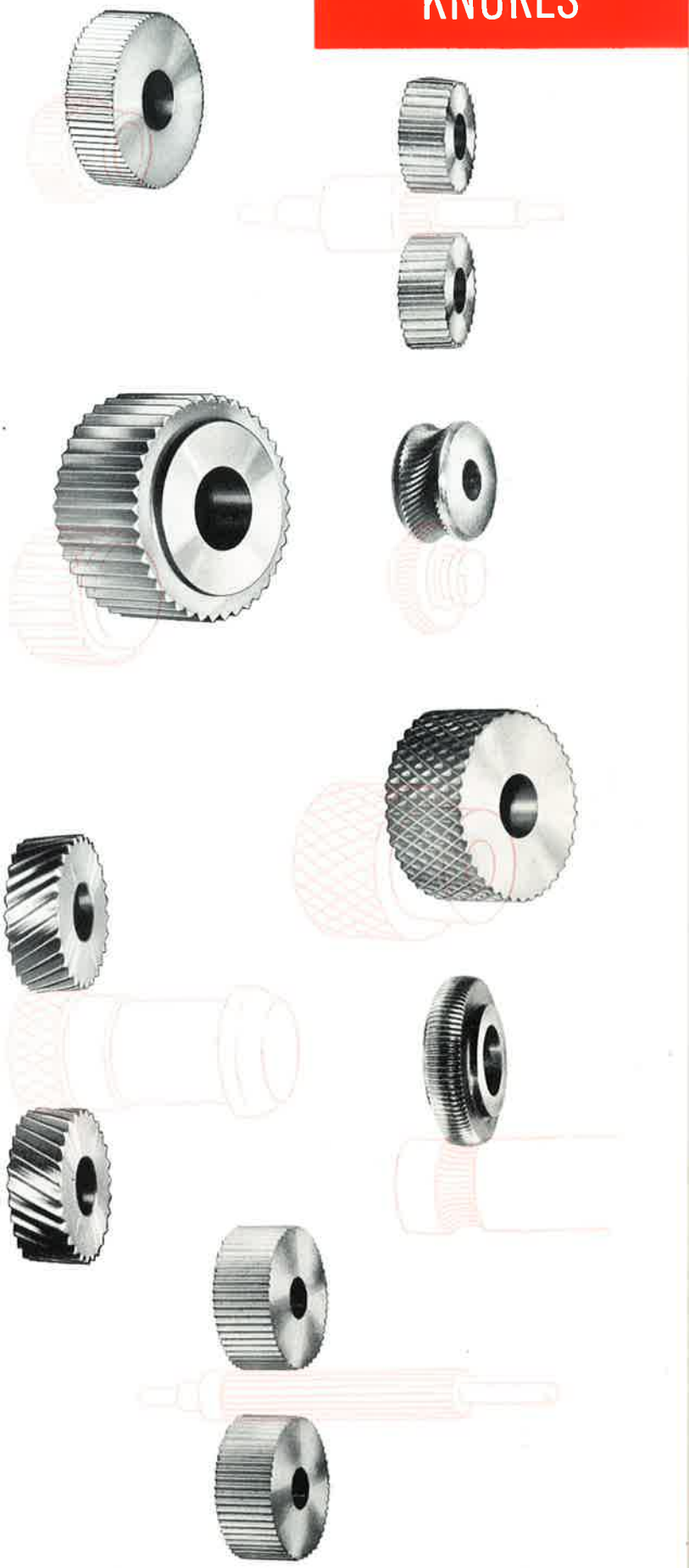
Reed supplies Knurls for a wide variety of applications and for both circular and diametral pitch systems. These knurls are used in all types and makes of knurl holders operating from the cross slide or turret positions on screw machines and lathes.

Experience has proven the use of precision knurls for all applications, including decorative knurling and knurling for assembly purposes, is assurance of consistent quality and maximum performance.



Reed knurls produce smoothly finished knurl surfaces. The lapped finish on the hard knurling surface contributes to outstanding performance and longer life. Precision manufacture insures uniformity of tooth form, diameter, hole size and concentricity.

KNURLS

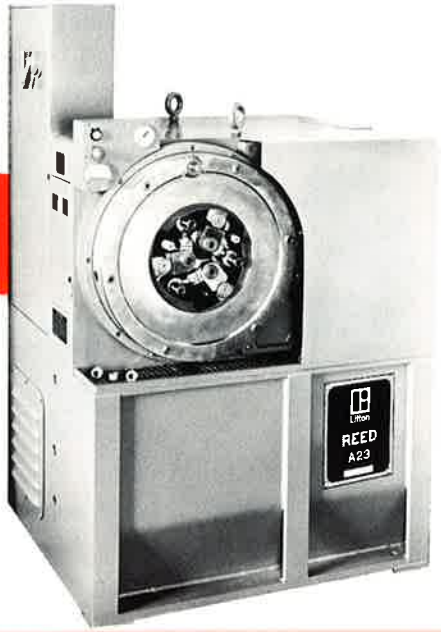


Thread Rolling Machines

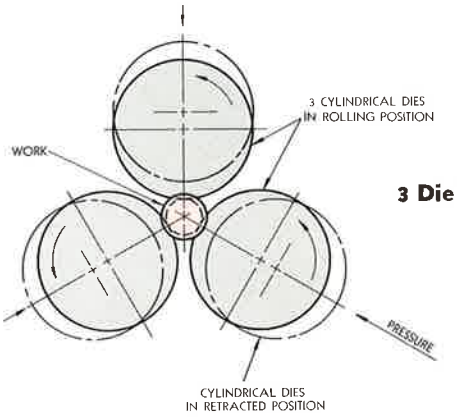
Thread and form rolling of a wide variety of parts is possible in each of the seven standard models of Reed Cylindrical Die Machines. Offered in both vertical and horizontal models, they may be arranged for manual operation or furnished with work handling equipment for semi- or fully automatic operation.

Models A22B and A22HB

Model A23



Thread rolling in the Reed machine is a simple, but positive operation. Axial positioning of the blank in relation to the



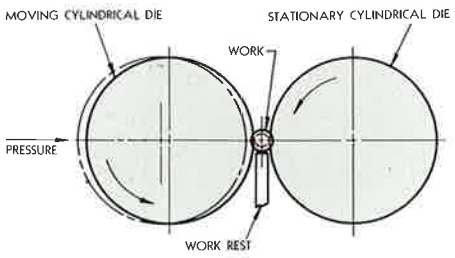
3 Die Type

Model	Type	Diameter Capacity Range		Application
		In-Feed	Thru-Feed	
A22B	Three Die Vertical	5/32"-3¼"	¼"-1"	For general purpose work — manual operation. Also used for high speed automatic operation.
A22HB	Three Die Vertical	5/32"-3¼"	¼"-1"	Heavy duty in-feed rolling of a range of parts with longer thread lengths on harder materials.
A23	Three Die Horizontal	5/32"-3¼"	¼"-1"	For work which is easily supported in horizontal position — manual or automatic operation.
A34A	Three Die Horizontal	¾"-4"	¾"-2½"	Heavy duty in-feed rolling of large diameters. Also used for thru-feed rolling.
B112	Two Die Horizontal	0"-2½"	0"-2"	Wide range for in-feed and thru-feed rolling of either large or small quantity production.

dies in the three die type machine is controlled by the self centering action of the dies which act simultaneously on the blank floating between them.

Initial positioning of the blank in the two die type machine is accomplished by means of bushings, work guides or blades.

The five standard machines illustrated on these pages are designed for in-feed rolling, thru-feed rolling, or a combination

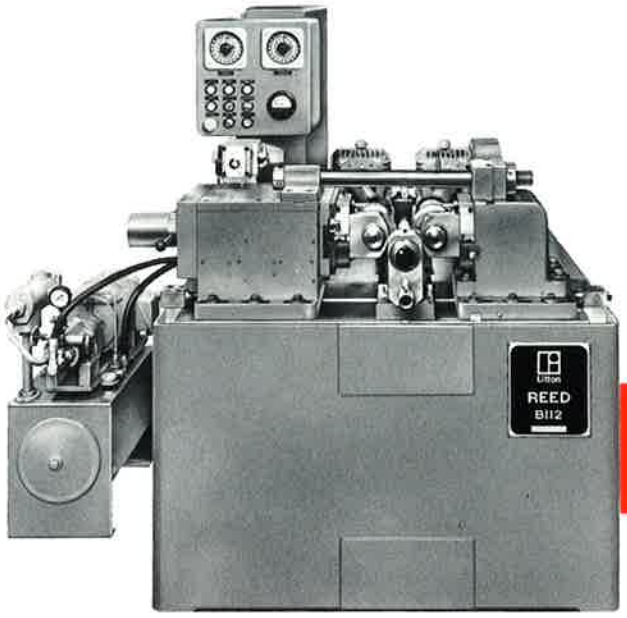


2 Die Type

of both. Positive control of penetration rates and duplication of size is maintained by the mechanical type of cam feed for in-feed rolling. This is a distinctive feature of Reed Machines. The dies are held in a fixed position for continuous thru-feed rolling where no actuation is required.

Standard cams, in conjunction with a full range of die and cam speeds, offers wide combinations of cycles of penetration, dwell and release of the dies, which varies depending on materials, work, and thread or form specifications.

Model A34A



Model B112

Reed Machines are used to roll

a wide variety of threads and forms including . . .

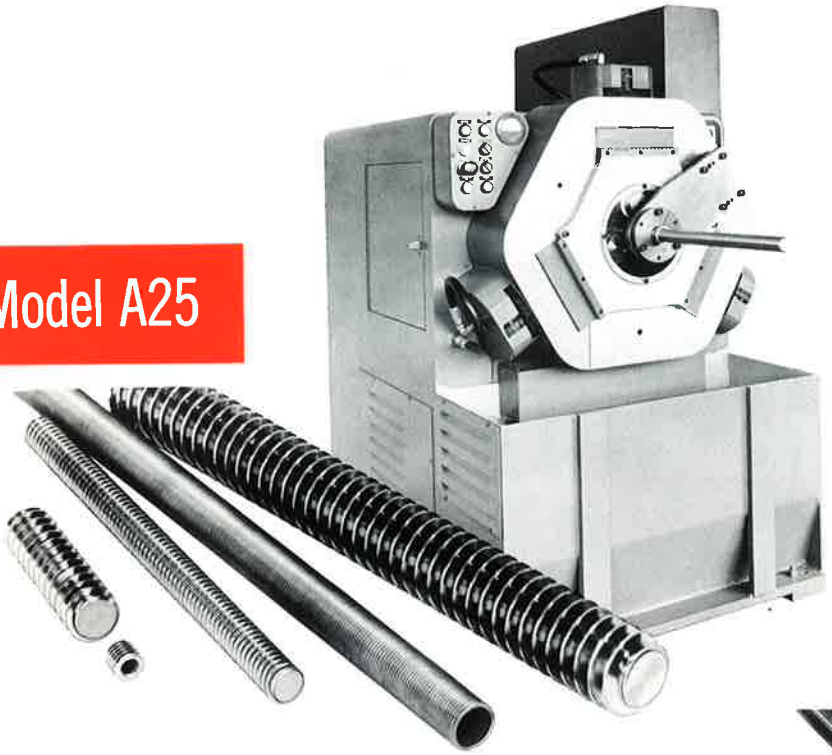
All common thread forms
Metal Stampings
Left-hand Threads
Multiple Lead Threads
Pilot and Step Threads
Burnishing
Annular Rings
Tapered Threads
Hollow Parts
Knurling
Serrations
Oil Grooves

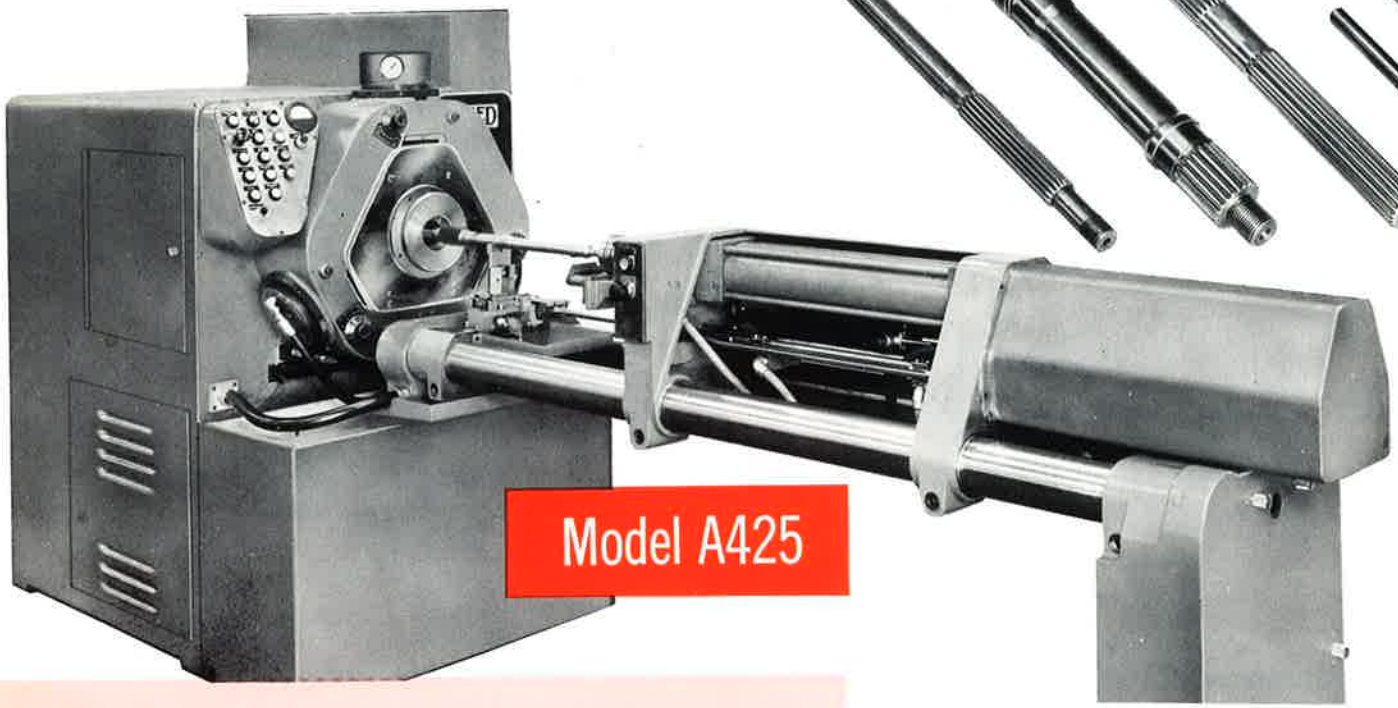
Thread Rolling Machines

To meet specific requirements of thread and form rolling, Reed developed the Model A25, a simplified rugged thru-feed thread rolling machine, and the Model A425, for rolling involute splines and serrations.

For successive feeding through the machine of work without shoulders, regardless of length, the dies are located in a fixed closed position. A system of hydraulic actuation for automatic opening and closing of the dies is available for work that is returned to the front of the machine for unloading.

Model A25





Model A425

Model	Type	Diameter Capacity Range	Application
A25	Three Die Horizontal	Threads and Similar Forms ½"–2½"	Especially for thru-feed rolling—with adjustable skew axis die holders.
A425	Three Die Horizontal	Splines and Serrations—$\frac{16}{32}$ D.P. Max.	For rolling precision involute splines and serrations.

Rolling loads are confined within the massive triangular stress system which provides exceptional stability and uniform size control. The dies may be set at either parallel or skewed axis.

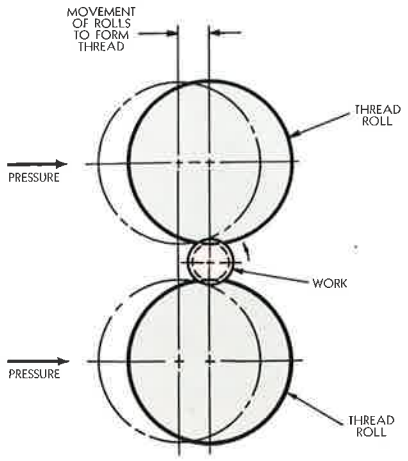
Flexibility is achieved with unit construction making these machines ideally suited for large or small quantity production of a wide range of applications.

Thread Rolling Attachments

Series B

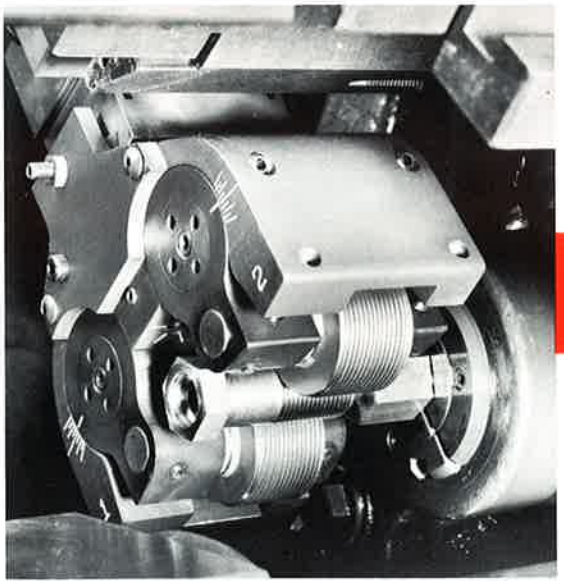
The Reed Thread Rolling Attachment is currently built in six standard sizes, for use on more than 100 different single and multiple spindle bar automatics and automatic lathes. Each size is adjustable and suitable for a wide range of straight and tapered threads.

By using the Reed Thread Rolling Attachment on automatic screw machines and automatic lathes, it is possible to produce smooth precise threads at high production rates. Rolling threads close



to a shoulder is readily performed, and as rolling threads on the collet end of the part behind a shoulder is possible, a secondary threading operation is often eliminated.

Thread Rolling is an economical and preferred method of producing threads on automatic screw machines. Close tolerances are easier to maintain, threads are stronger, production rates are higher, down time for replacing tools is eliminated



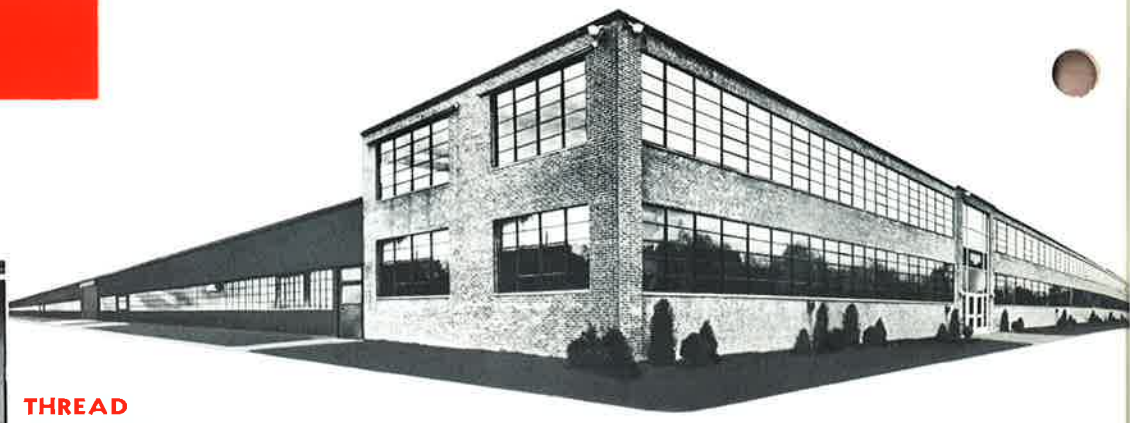
and the accuracy of the setup is maintained on long production runs.

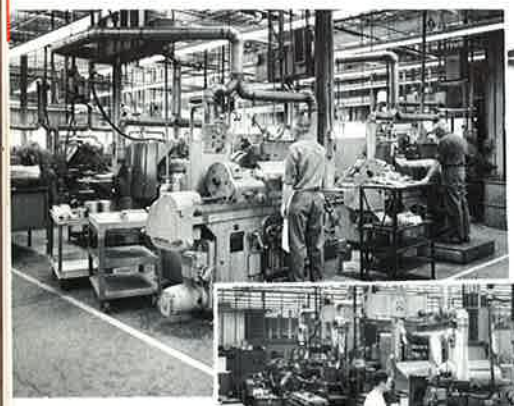
With the assistance and cooperation of the machine manufacturers, this versatile attachment was developed to provide wide capacity for a variety of applications. It is rugged in construction, easy to set up, and incorporates a simple means for readily changing thread rolls and adjusting them for size. The Reed Attachments feature a dovetail clamping arrangement, precise matching and self-compensating roll action. These features, exclusive with Reed Attachments, account for superior roll performance, longer roll life, less machine down time and better quality threads.

MORE CAN BE DONE

Model No.	Max. Thread Length (Less approximately 3 pitches)	Straight Threads		Pipe Threads Straight and Taper	
		Diameter Capacity Range	Approx. No. of Standard Threads	Diameter Capacity Range	Approx. No. of Standard Threads
B5	9/16"	0 – 5/16"	45	—	—
B8	9/16"	0 – 1/2"	70	1/16"– 1/4"	5
B10	3/4"	0 – 5/8"	80	1/16"– 3/8"	7
B13	1"	1/8"–13/16"	90	1/16"– 1/2"	9
B18	1 1/4"	1/4"–1 1/8"	105	1/8"– 3/4"	15
B36	1 1/4"	3/8"–2 1/4"	185	1/4"–1 1/2"	18

REED FACILITIES

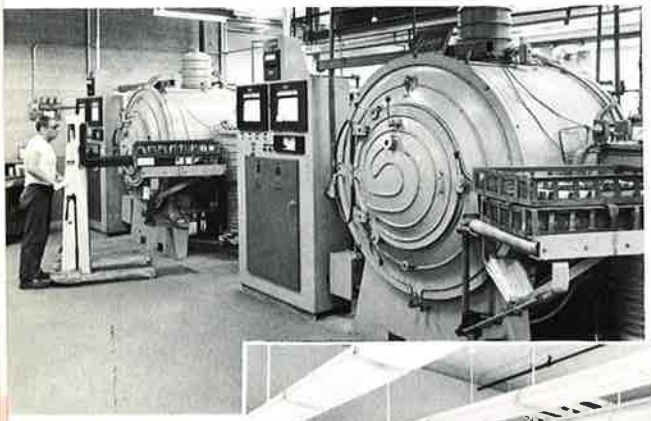




THREAD GRINDING ROUND DIES

THREAD GRINDING FLAT DIES

Reed facilities and highly skilled, experienced personnel assure the precise manufacture of superior dies of uniform quality. Precision grinding equipment and a large variety of tooling fulfill customers' requirements for both standard and special thread rolling dies.



HEAT TREATING

Reed has long and varied experience in the heat-treatment of die steels. The use of the most modern heat-treating equipment, plus careful processing, provides uniformly high quality resulting in long die life.

INSPECTION

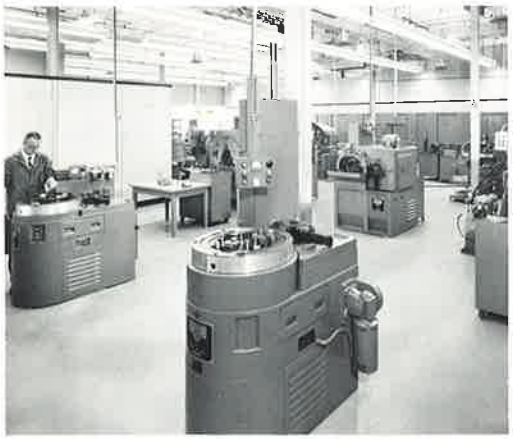
Precision equipment is used for inspecting all Reed thread rolling dies to assure conformance with rigid specifications. Special attention is given to thread form and other important requirements relating to the application of the dies. All inspection equipment is available to assist customers with their threading problems.

Specialists in Thread and Form Rolling

Reed specializes in the application, operation, and setup of thread rolling tools and equipment. The wide and varied experience gained in over 55 years of close association with thread and form rolling has enabled Reed to assist many makers and users of threaded products with their thread rolling applications.

With a thorough knowledge of thread standards and specifications, as well as considerable practical experience, Reed engineers are in a position to appraise thread rolling possibilities and recommend the process where it will improve quality and reduce costs.

Reed, through its pioneering in thread rolling research, has established a reputation as a leader in this field. To keep pace with the increasing demands for the use of the thread and form rolling process, Reed offers the services of an Application Development Department equipped with



APPLICATION DEVELOPMENT DEPARTMENT

representative thread rolling equipment and tools for special rolling applications.

A wide variety of Reed booklets is available related to thread and form rolling. This provides industry with a complete collection of technical information on the thread and form rolling process and its application.

REED SERVICE

World's Largest Stock of Thread Rolling Tools

TYPES AND SIZES INCLUDE

FLAT DIES **400**

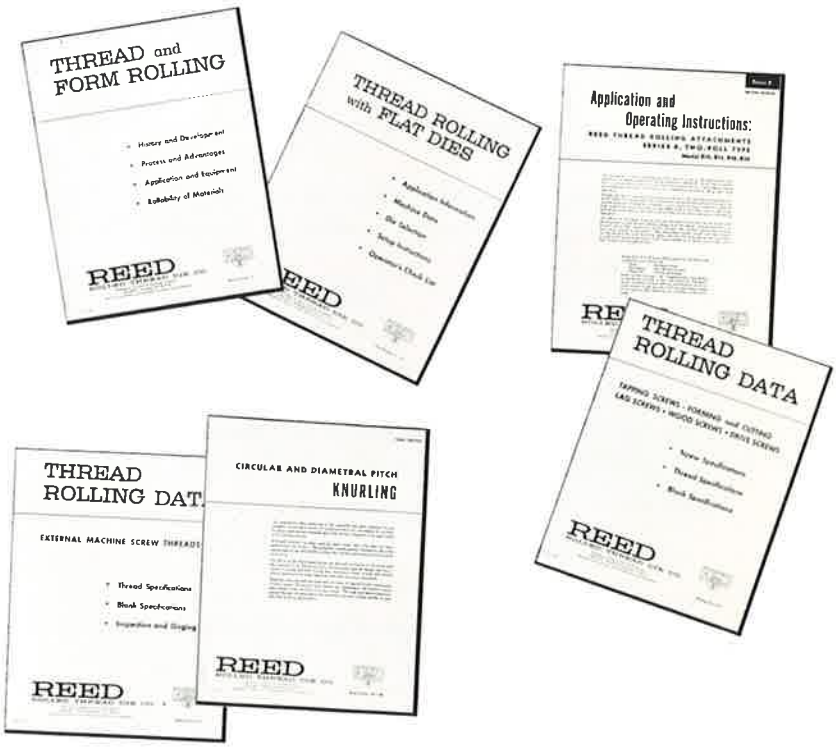
PLANETARY DIES **15**

CYLINDRICAL DIES **130**

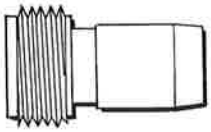
THREAD ROLLS **230**

KNURLS **200**

Complete Technical Literature

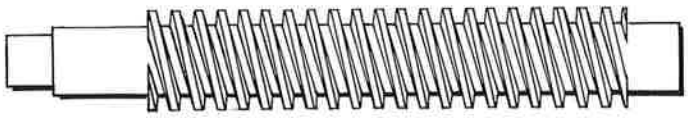


JOB REPORTS



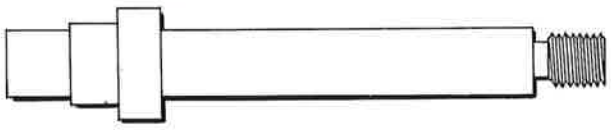
.452–32NS
Brass

8,000,000 pieces rolled with pitch diameter variation held to within .0006 and no adjustments required using Reed Model B8 Thread Rolling Attachment.



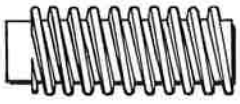
8TPI 29°
Centralizing Acme C1018 Steel

25 miles (132,000 feet) rolled in Reed Model A23 Machine with same die setting.



1–14 UNS
Stressproof Steel

30% better quality when rolled with Reed Model B18 Thread Rolling Attachment because of improved finish and quality.



9/16–24 Diametral Pitch
14-1/2° Pressure Angle
Bronze

Superior surface finish on worm thread rolled in Reed Model A22 Machine eliminated undesirable transmission noise in worm assembly.

Rolled Threads are Uniform

Rolling maintains the accuracy of the original setup during long runs of high speed production. Thread rolling dies do not wear out in the same manner as other threading tools. Thread rolling dies fail either by fatigue crumbling of the crests, or by spawling away of entire threads. Either type of failure is readily detected on the dies, which may be removed as soon as the failure has proceeded far enough to be noticed on the threads of the rolled parts. It is often possible to continue to use dies long after the first signs of failure appear, as subsequent contact with undamaged portions of the dies will iron out marks made by the crumbled portions. If the blanks are uniform, the dimensions of the finished threads will change very little, if at all, as long as the dies remain whole.

Rolled Threads are Smooth

In thread rolling, the threads produced are ordinarily smoother than the dies. This is due to the slight slipping and burnishing that the thread receives as it rolls against the die. Therefore, by using carefully ground and polished dies, the ultimate in smoothly finished threads can be obtained.

Comparison of Common Thread Finishes

TYPE OF THREAD	SURFACE ROUGHNESS — MICRO INCHES 250 125 63 32 16 8 4 2
SCREW MACHINE CHASED THREADS	
MILLED THREADS	
GROUND THREADS	
ROLLED THREADS	

Thread Rolling Saves Time

Rolling has long been recognized as the fastest method of producing screw threads. Thread rolling machines may be manually loaded or arranged with semiautomatic or completely automatic feeding devices. Fully automatic hopper-fed thread rolling machines can be operated in batteries with several machines to each operator. Although it is generally appreciated that thread rolling has proved economical on large quantity production, similar savings are realized on small lots.

Threads may be rolled on automatic screw machines without reducing spindle speeds, and the fact that rolling can be done on the collet end of the part behind a shoulder often saves a secondary threading operation.

Thread rolling dies do not require sharpening; therefore, down time is reduced, sharpening and resetting labor is saved. The inherent uniformity of rolled threads also saves inspection labor.

Thread Rolling Saves Material

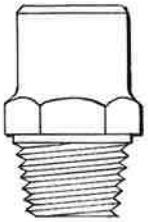
Since no material is wasted in the thread rolling operation, blanks must be made smaller than the major diameter of the thread, thereby permitting saving of expensive materials. The accompanying table shows the savings for a number of representative thread sizes when the blanks can be drawn or extruded to the rolling diameters.

On stampings, the thickness of metal from which the stamping is made can often be reduced. This also reduces the weight of the scrap strip or sheet from which the stamping is made.

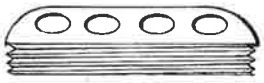
Material Saved

Thread Size	Material Saving	Thread Size	Material Saving
8–32	24%	¾″–10	16%
¼″–20	25%	1″–8	18%
⅜″–16	27%	1¼″–7	16%
½″–13	19%	1½″–6	16%
⅝″–11	19%	2″–4½	15%

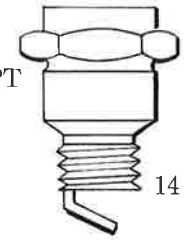
JOB REPORTS



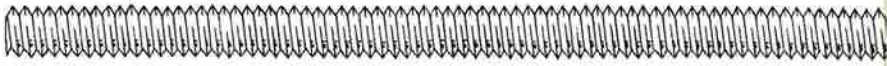
33 per Minute
Pipe Fitting—⅝″ NPT



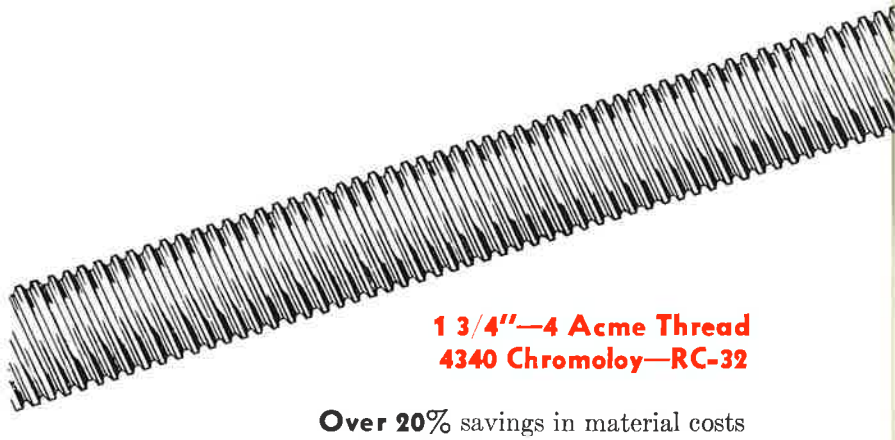
26 per Minute
3⅛″ Bearing Retainer Nut



50 per Minute
14 MM Spark Plug Shell

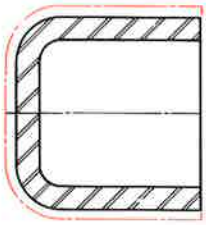


350 Inches per Minute
⅜″ Threaded Rod

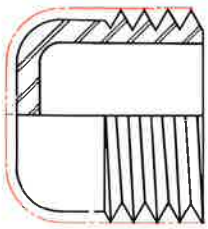


1 3/4″—4 Acme Thread
4340 Chromoloy—RC-32

Over 20% savings in material costs by thread rolling.

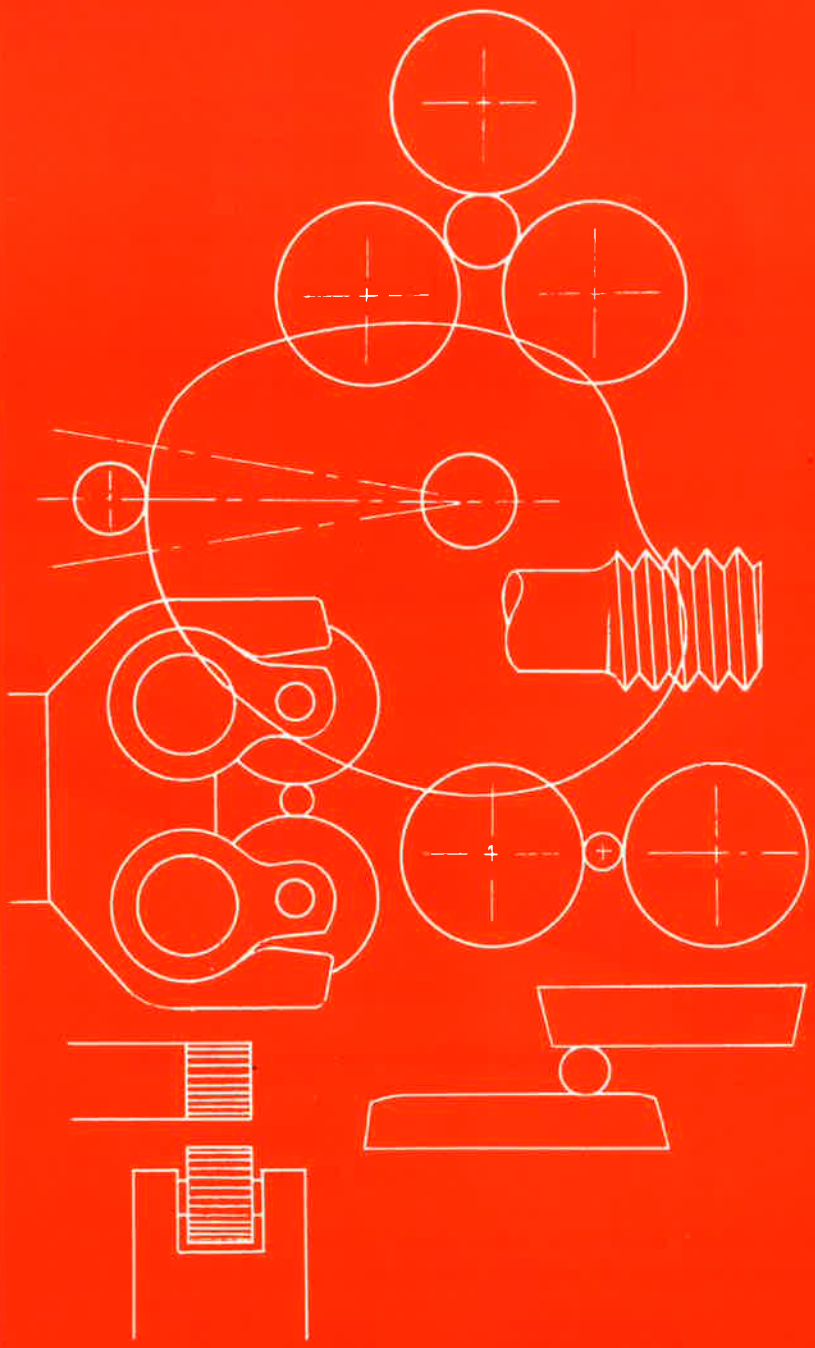


STAMPING PRIOR TO THREADING



STAMPING AFTER THREADING

Thinner Metal in design of stamping is possible by thread rolling.



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