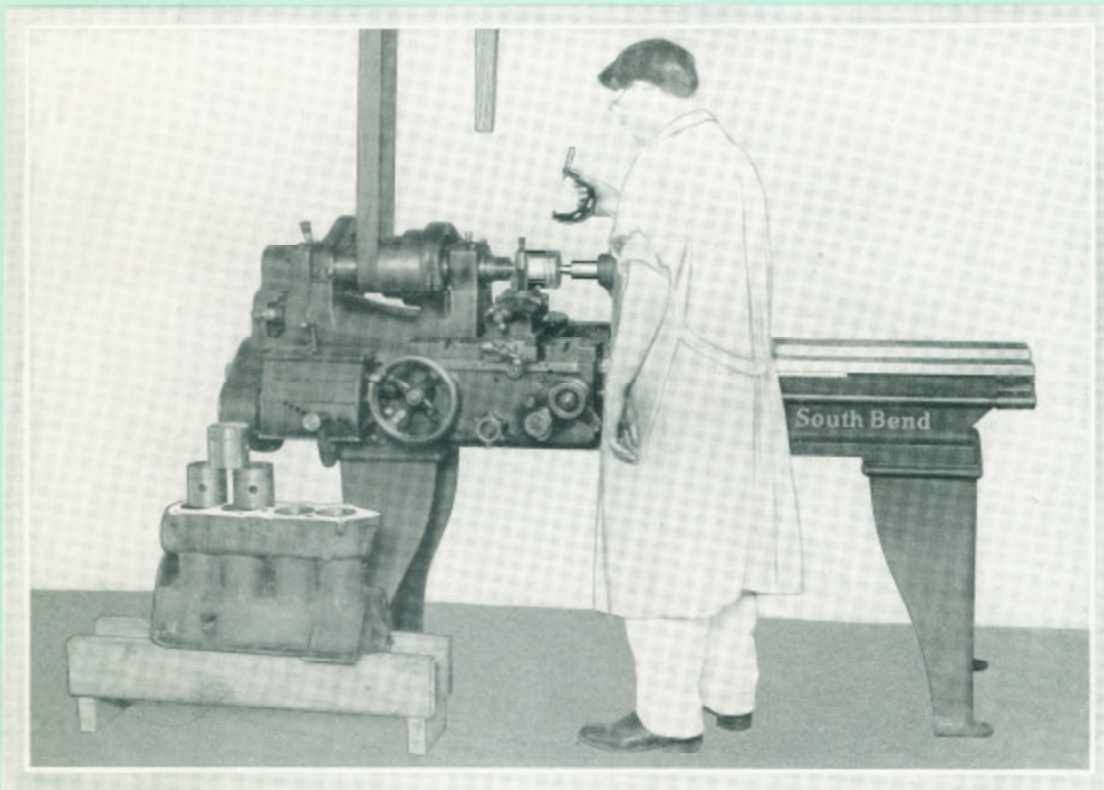
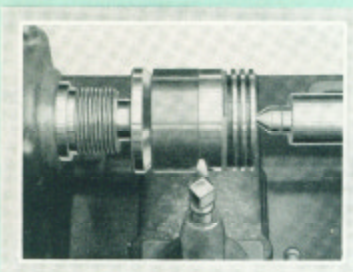


The Correct Way to Machine Oversize Pistons

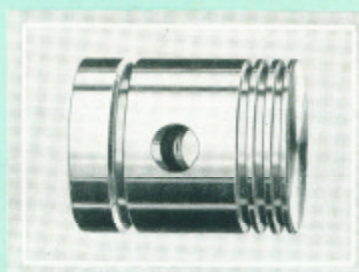


Turning to Finished Diameter a Semi-Machined Piston on a South Bend Lathe



Turning a Piston on the Lathe

The South Bend Lathe with specially designed No. 44 Cone Ring Piston Adapter is the practical equipment for turning semi-machined Pistons to finished diameter to fit reground cylinders.



Finished Piston Turned on Lathe

Universal Piston Equipment

The No. 44 South Bend Cone Ring Piston Adapter specially designed for South Bend Lathes will permit machining to finished diameter all sizes, all makes and all types of oversize and semi-machined Pistons with and without center hole in head, to fit cylinder blocks of every kind and description for autos, trucks, busses, tractors, motorcycles, and even airplane motors.

BULLETIN NO. 85

South Bend Lathe Works
725 East Madison St., South Bend, Indiana

Crowder, 1935
South Bend Lathe Works



The New
"South Bend"

the Lathe with Practical Attachments

The Correct Way to Machine Semi-Finished Pistons

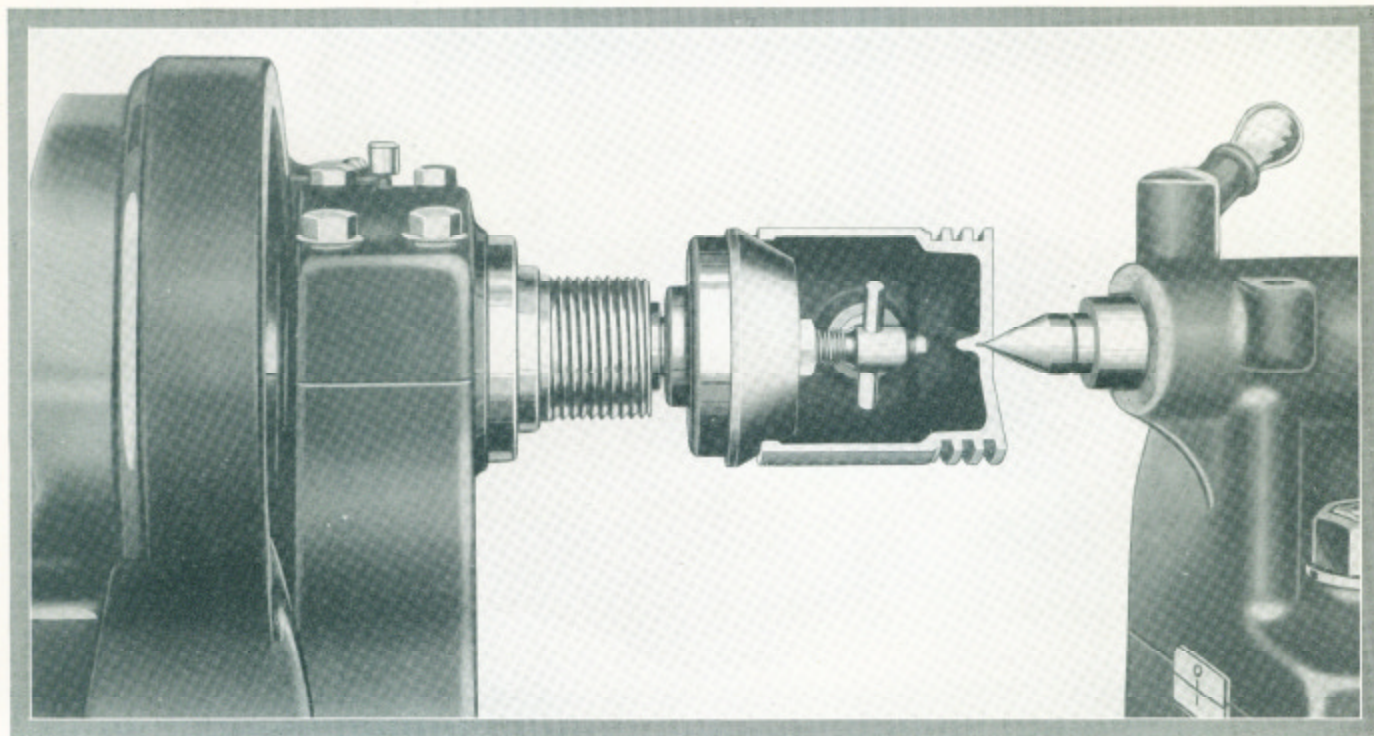


Figure 4P. A Piston Mounted on the No. 44 South Bend Cone Ring Adapter

Figure 4P shows the No. 44 South Bend Cone Ring Piston Adapter fitted in the head of the lathe spindle, which holds and drives the Piston while being machined.

The skirt centers on the Cone Ring of the Adapter with the head supported by the Tail Stock Center. The Piston appears in cross section to show the method of driving.

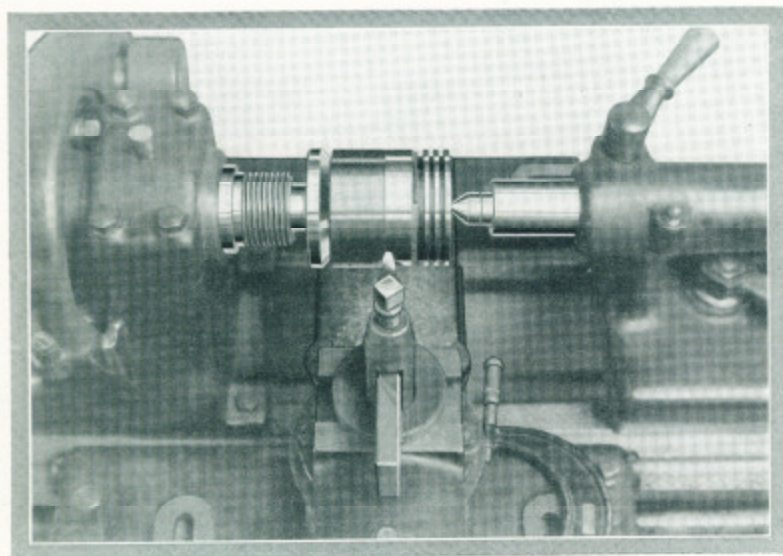


Figure 5P. Taking a finishing cut on a Piston.

Roughing and Finishing Cuts

Figure 5P shows a close-up of a finishing cut being taken on a Piston with No. 44 Cone Ring Adapter. Turning Pistons to finished diameter on the lathe is arranged for by means of roughing and finishing cuts. The roughing cuts are intended to remove the required amount of stock preliminary to taking the finishing cuts.

The South Bend Method Insures Uniformity in Size and Finish

The South Bend method of turning Pistons insures perfect uniformity in size and finish because but one set-up of the tool is required for each cut. The cuts can be made as delicate as desired because the cross feed screw on lathe permits an adjustment to one-half thousandths of an inch.

Job Instruction Sheets Explain Every Detail

The South Bend Method of Machining Pistons is explained in detail in Job Instruction Sheet No. 85 furnished with the No. 44 Adapter. Each operation is explained step-by-step.



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No. 44 South Bend Cone Ring Piston Adapter

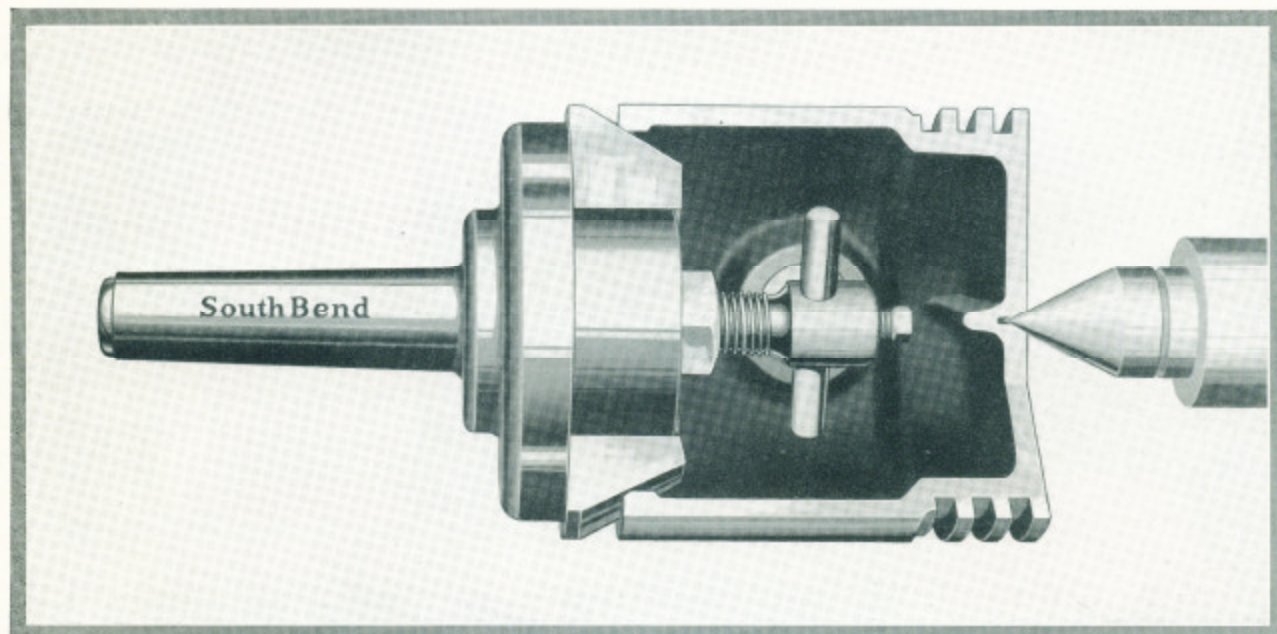


Figure 6P. The Correct Way to Hold a Piston

Figure 6P shows the No. 44 South Bend Cone Ring Adapter with taper shank. A portion of the ring and Piston is cut away to show how the Cone Ring fits onto the hub of the Adapter shank. An

adjustable driver locked by a hexagon nut permits the handling of all sizes of Pistons. All Adapter Rings are interchangeable on the hub of the No. 44 Adapter Shank.

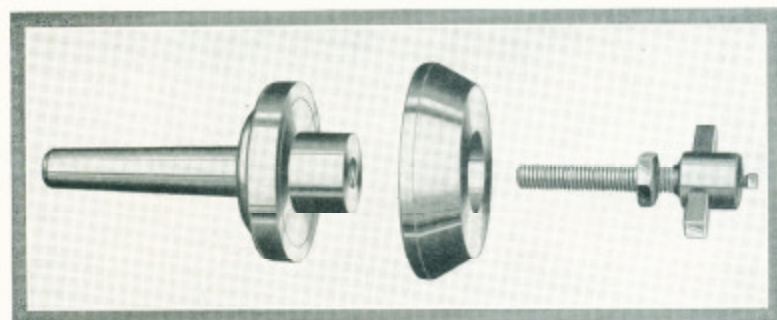


Figure 7P

Figure 7P shows the parts which make up No. 44 South Bend Cone Ring Adapter.

No. 44 South Bend Cone Ring Piston Adapter complete with Driving Dog, and 4 finished machined Cone Rings, No. 1-D, 2-D, 3-D and 4-D, for Pistons ranging in size from 2 3/8 to 5 1/2 inches outside diameter. Shipping Weight 20 lbs. Net Factory Price..... \$17.00

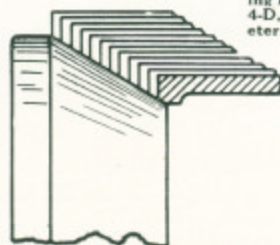


Figure 9P

One Cone Ring Will Hold Many Pistons

Figure 9P

Figure No. 9P shows why the range of Piston sizes for each Cone Ring is large and how the taper eliminates the need of the operator machining the rings in any way prior to placing the Piston on the Adapter.

Set of Four Cone Rings Furnished with No. 44 South Bend Adapter

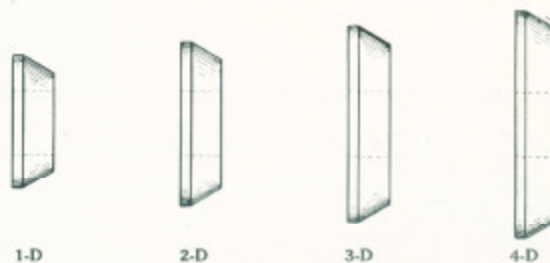


Figure 8P

Figure 8P shows four Cone Rings furnished with the No. 44 South Bend Adapter. These Rings are finish machined and tapered to a 60 degree included angle so that the skirt of the Piston regardless of size, kind or make will center itself perfectly. The Cone Rings are all interchangeable on the hub of the No. 44 Adapter Shank.

Capacity of Cone Rings and Net Factory Prices

Cone Ring No.	Outside Diam. of Cone Rings	Will Hold Piston Outside Diameter	Price Extra Cone Rings
1-D	3 3/4 in.	2 3/8 in. to 3 3/8 in.	\$1.75
2-D	3 7/8 in.	3 3/8 in. to 4 in.	1.75
3-D	4 1/8 in.	4 in. to 4 3/4 in.	1.75
4-D	5 1/4 in.	4 3/4 in. to 5 1/2 in.	1.75



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How to Locate the Center Hole in the Head of a Piston

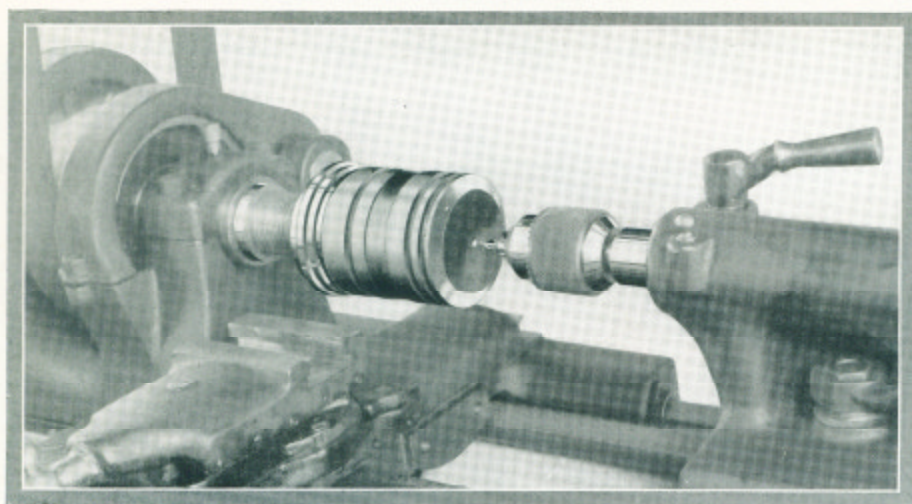


Figure 10P

Drilling the Center Hole in the Head

Figure 10P

Figure 10P shows the Piston mounted on the Adapter while being drilled for the center hole in the head. The combined Drill and Countersink held in the Drill Chuck is shown as it has finished drilling the hole.

Step Rings and Eyebolt Driver

Figure 11P

Figure 11P shows the Piston without a center hole held in lathe by means of the taper shank of the No. 44 South Bend Adapter used in connection with the proper size Step Ring and Eye Bolt driver. This method centers the Piston accurately.

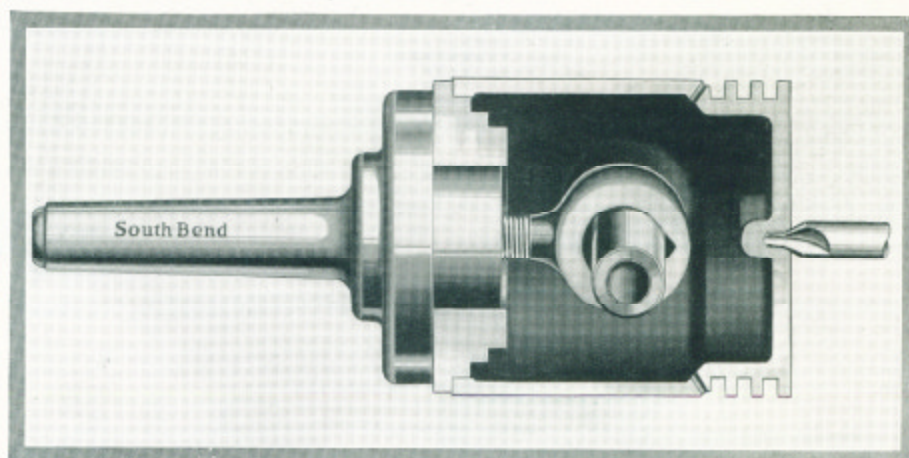


Figure 11P. Step Ring and Eye Bolt Driver

Equipment Required for Locating Center Holes in Piston

Figure 12P

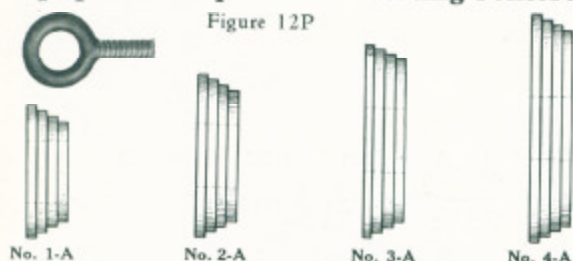


Figure 12P shows four step rings left rough turned for machining to size to fit the inside diameter of the skirt of Piston on which they will be used.

Specifications and Net Factory Prices

Catalog No.	Outside Diameter	Outside Diameter of Pistons Accommodated	Price Each
1-A	3 ³ / ₈ in.	2 ⁵ / ₈ in. to 3 ³ / ₈ in.	\$2.00
2-A	3 ⁷ / ₈ in.	3 ¹ / ₄ in. to 3 ⁷ / ₈ in.	2.00
3-A	4 ⁵ / ₈ in.	4 in. to 4 ⁵ / ₈ in.	2.00
4-A	5 ³ / ₈ in.	4 ³ / ₄ in. to 5 ³ / ₈ in.	2.00

No. 20 Drop Forged Eyebolt Driver threaded to fit into No. 44 Adapter Shank. Shipping Weight 1 lb. Net Factory Price each..... \$.75

Special Step Rings machined to any diameter, Weight 2 lbs. Net Factory Price each..... \$2.00

Device for Holding all Adapter Rings

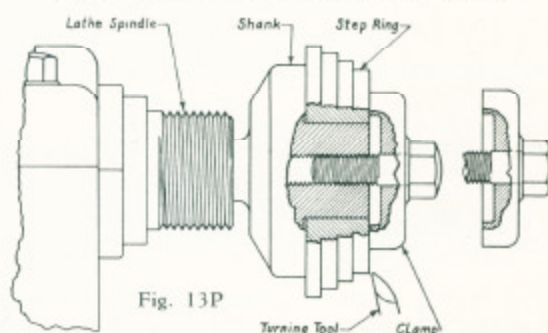


Fig. 13P

Figure 13P shows a Step Ring locked in place on the hub of the No. 44 Adapter shank with the special clamp washer. Thus held, the steps are machined to the required size.

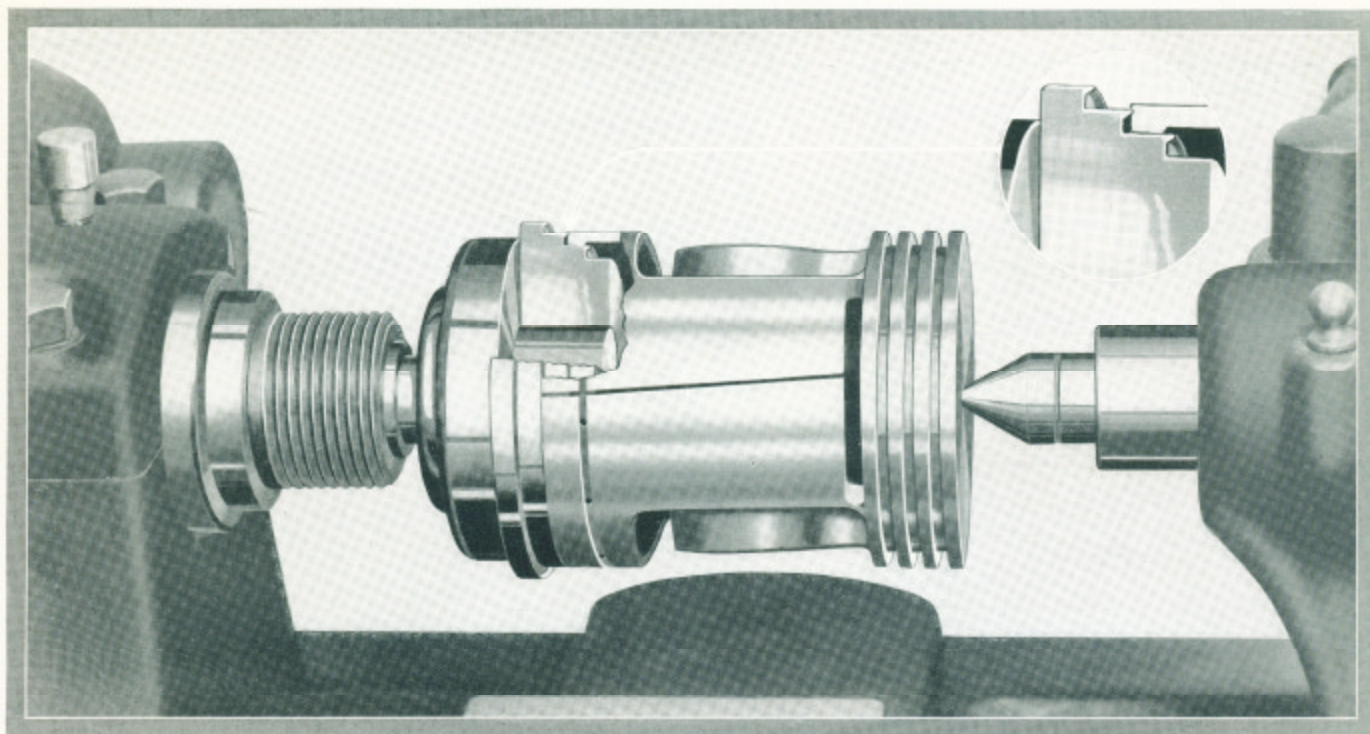
No. 23 South Bend Special Clamping Device to fit No. 44 Adapter Shank for machining Adapter Rings, Wt. 1 lb. Net Factory Price \$1.75



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Machining a Split Skirt Piston



Split Skirt Piston Mounted on No. 44 Adapter Using Special Steel Step Ring

Figure 14P shows a split skirt Piston mounted on the No. 44 Adapter shank. An eyebolt driver threaded to fit the Adapter Shank holds the Piston firmly against the sharp edge of the steel step ring as shown in the illustration and prevents it from spreading under pressure of the cut.

No. 20 Drop Forged Eyebolt Driver threaded to fit No. 44 Adapter Shank, for use with Steel Step Rings, Shipping Weight 1 lb. Net Factory Price each... \$.75

When ordering Steel Step Rings, be sure to state the outside diameter of the Piston for which the Steel Step Ring is desired. The Rings are furnished rough turned. The sharp edge must be machined and the step turned to size to fit the inside diameter of the Piston skirt.

No. 1096 Special Steel Step Rings rough machined to any size, Shipping Weight Approximately 2 lbs. Net Factory Price each..... \$3.00

No. 66 Production Type Piston Adapter

The No. 66 Production type of Piston Adapter is recommended for the shop where turning is confined largely to one make, size and kind of Piston.

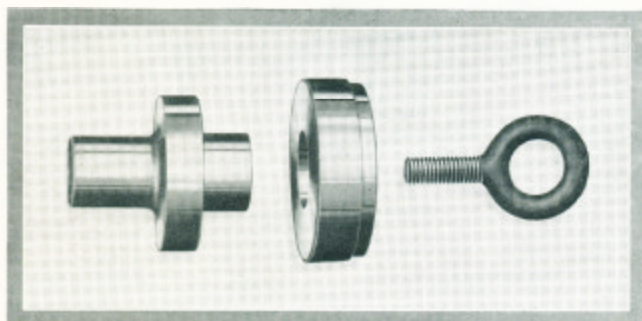


Figure 15P

Figure 15P shows the parts which make up the No. 66 Production Adapter. In ordering, state outside diameter of Piston for which Ring is wanted, as any size of ring can be supplied.

No. 66 South Bend Production Piston Adapter, complete with one Ring and Eyebolt Driver, Shipping Weight 12 lbs. Net Factory Price..... \$12.00

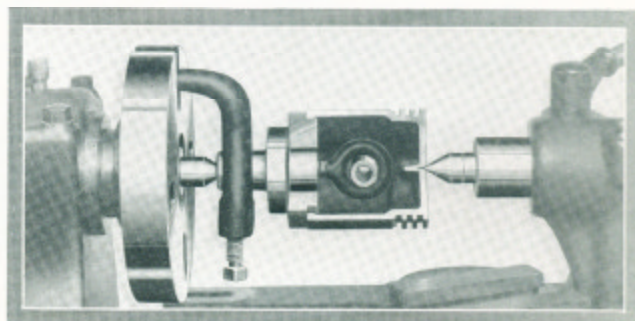


Figure 16P

Figure 16P shows the No. 66 South Bend Production Type Piston Adapter with a section of the Piston cut away to show the manner of mounting and driving.

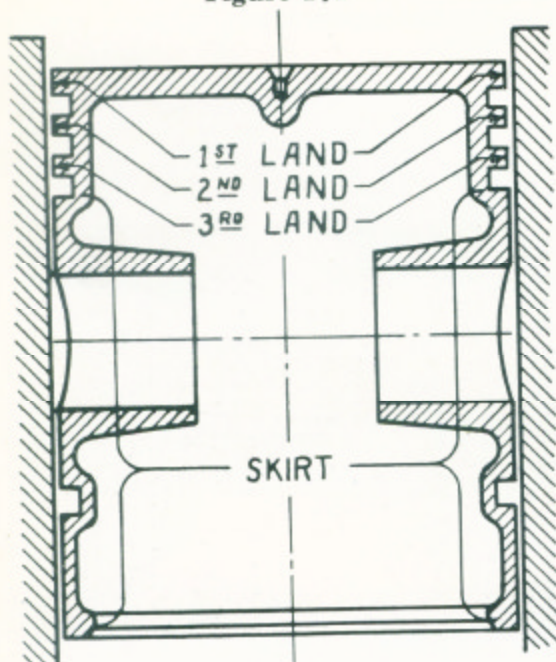
No. 66-E Rings to Fit Hub of Shank of No. 66 Adapter (state diameter wanted) Shipping Weight 1 lb. Net Factory Price each..... \$2.00



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Figure 17P



PROPER CLEARANCES

- 1ST LAND—.003" PER INCH DIA. OF BORE
- 2ND LAND—.003" PER INCH DIA. OF BORE
- 3RD LAND—.002" PER INCH DIA. OF BORE
- SKIRT—.001" PER INCH DIA. OF BORE

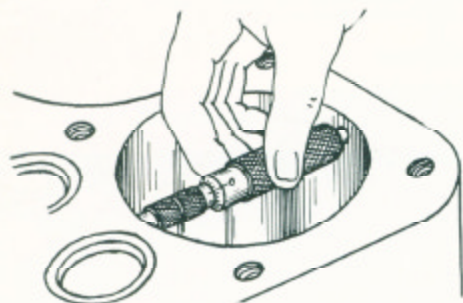


Figure 19P. Measuring the Diameter of Cylinder Bore with an Inside Micrometer

Figure 19P shows the method of applying the inside micrometer to the cylinder. Complete information covering this point is treated thoroughly in the Job Instruction Sheets which explain how to do the work.

Attachments for South Bend Lathes

All South Bend Lathe attachments are designed for our lathes only and are not guaranteed to fit lathes of other makes.

Rules for Piston Clearance

Figure 17P shows a cross section of a Piston with the parts named which require clearance. The Rule for Piston clearance together with other valuable information showing how to do this work is covered thoroughly in our Job Instruction Sheets which are furnished with each No. 44 South Bend Cone Ring Piston Adapter.

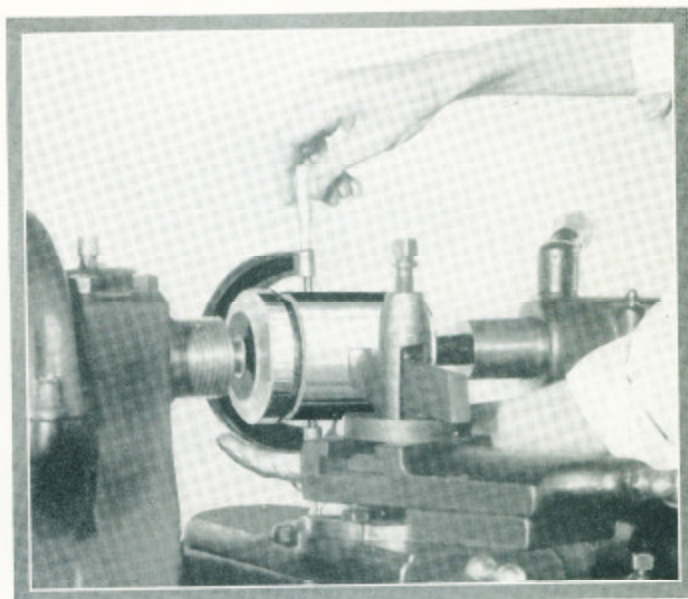


Figure 18P—Measuring the Finished Piston with a Micrometer

Figure 18P shows the use of the micrometer in measuring Pistons in thousandths of an inch. This phase of determining Piston Clearance is fully covered in our Job Instruction Sheets furnished with South Bend Piston Adapter Equipment.

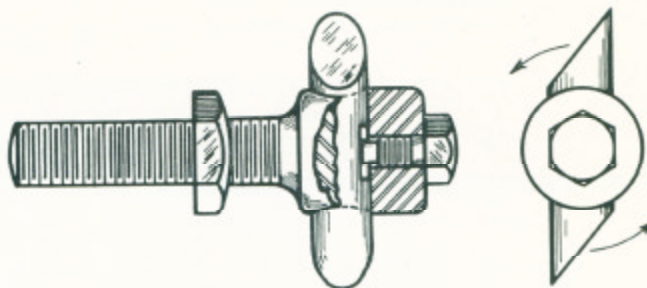


Figure 20P

South Bend Floating Driver for No. 44 Piston Adapter

The Floating Driver illustrated above is used with the No. 44 Cone Ring Piston Adapter when turning or grinding Pistons having a very thin wall. The driving pin fits loosely, is beveled on both ends and has an end movement of about one-half inch. The pin adjusts itself so that it drives equally on both wrist pin hubs.

No. 1095 South Bend Floating Driver for use with No. 44 Cone Ring Adapter. Price..... \$3.00

Catalog of South Bend Lathes

Our latest catalog illustrates, describes and prices the complete line of South Bend Lathes, Tools and Attachments. The catalog is FREE, mailed on request.



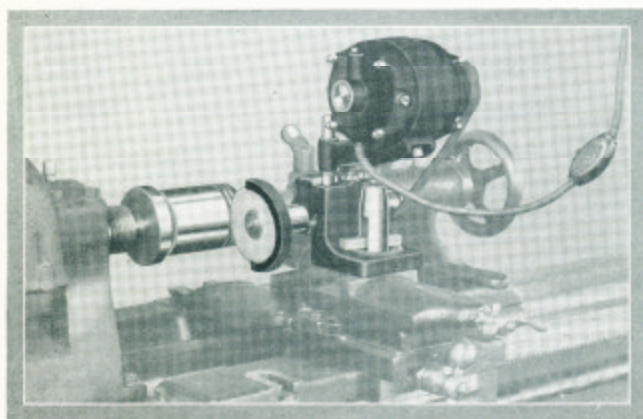
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Finish Grinding Pistons on the Lathe

The two Grinding Attachments illustrated below are suitable for this work and can be used for many other jobs, such as grinding wrist pins, valves, bushings, reamers of all kinds, lathe centers, taps, etc. They will produce a very accurate, highly finished surface comparing favorably with the work of an expensive grinding machine.

No. 9 Electric Tool Post Grinder



Operates from an Electric Light Socket

The skirt of the Piston rests on the No. 44 Cone Ring Adapter and the head is supported by the tail stock center. The Piston should first be rough turned to within ten thousandths of the finished size; then several light grinding cuts will complete the job without overheating or warping.

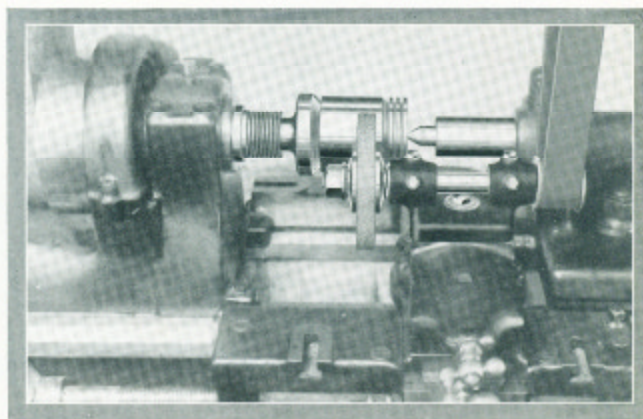
The No. 9 Electric Grinder is clamped to the compound rest of the lathe and may be set for straight cylinder grinding or at any angle required for grinding valves, taper reamers, cutters, etc. Adjustment is provided for tightening the drive belt so that the full power of the motor can always be delivered to the grinding spindle.

For Any Size of Lathe

This Grinder is suitable for use with any size of South Bend Lathe from 11 inch to 24 inch. When ordering be sure to state size and make of lathe and the electric current available in your shop.

No. 9 Electric Grinder complete including switch, extension cord and one 5 inch emery wheel, Shipping Weight 50 lbs. Net Factory Price \$75.00

No. 10 Countershaft Drive Grinder



Operates from Overhead Countershaft

The grinder frame is securely clamped to the compound rest top and will swivel to any angle for grinding bevels and tapers. The bearings are adjustable for wear and are provided with patent oil cups and felt wicks. When ordering give size and make of lathe and state kind of work grinder is to be used for.

Specifications and Net Factory Prices No. 10 Grinder

Catalog No.	Size of Lathe	Grinding Diam.	Wheel Width	Width of Belt	Shipping Weight	Price of Grinder
10-A	9 in. and 11 in.	4 in. x 1/2 in.	1 in.	20 lbs.	\$17.50	
10-C	13 in. and 15 in.	6 in. x 3/4 in.	1 1/2 in.	25 lbs.	20.00	
10-E	16 in. and 18 in.	6 in. x 3/4 in.	1 1/2 in.	30 lbs.	25.00	
10-F	21 in. and 24 in.	6 in. x 3/4 in.	1 1/2 in.	30 lbs.	25.00	

Special Drum Countershaft Required

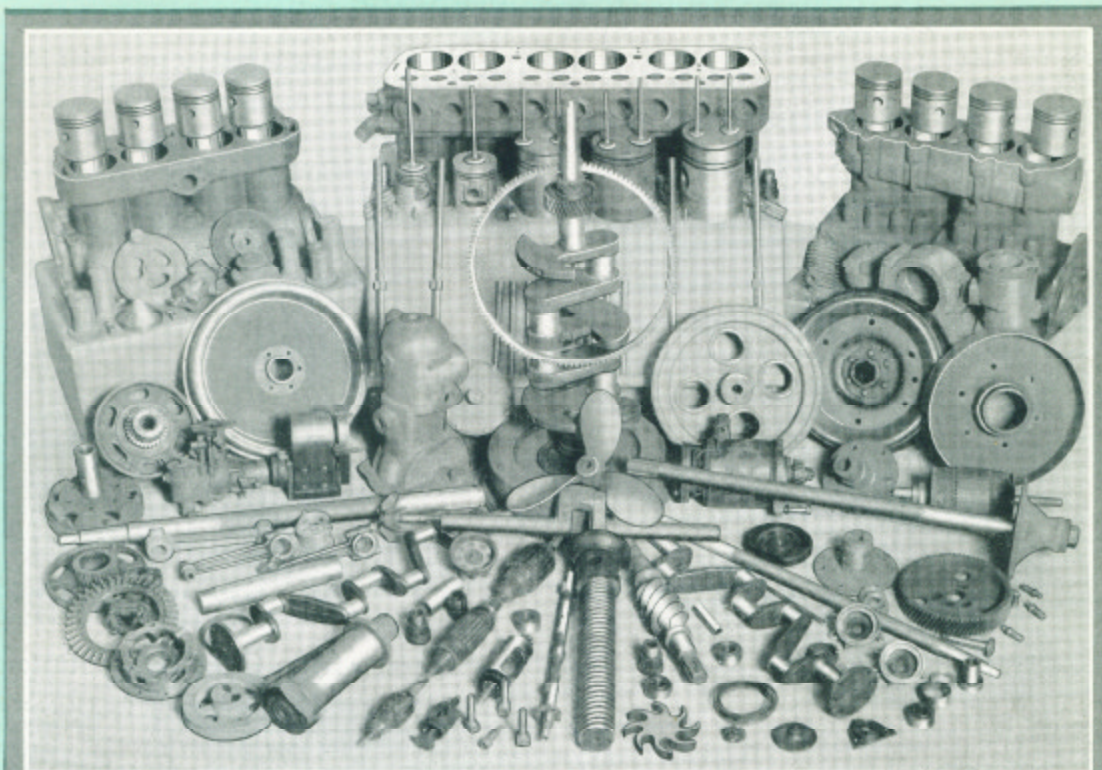
A Special Drum Countershaft equipped with tight and loose pulleys and a drum 20 inches long is mounted above the lathe to drive the No. 10 Grinder. This countershaft is required with No. 10 Grinder.

No. 11 South Bend Drum Countershaft complete for any size No. 10 Grinder, Shipping Weight 100 lbs. Net Factory Price \$25.00

Advantages of the South Bend Method of Turning Pistons to Size Using the No. 44 Adapter

- 1—It holds the Piston correctly, centers the skirt accurately and permits the proper drive and head support for the Piston.
- 2—It enables the operator to remove the Piston from the lathe, test it in the cylinder and replace it on the Adapter without destroying the accuracy.
- 3—It speeds up the work—with a little experience a set of six Pistons should be machined to finished size in fifty minutes.
- 4—It permits handling a wide range of Pistons as each Cone Ring has a capacity of from 15 to 20 different sizes of Pistons making a total of 60 to 80 sizes for the set of four rings furnished with the No. 44 Adapter.
- 5—It enables the operator to take one or more roughing cuts, depending upon the amount of stock to be removed.
- 6—It insures absolute uniformity of size of each Piston in a set because but one set-up of the turning tool of the lathe is required for each cut.
- 7—It enables the operator to put a turned surface on the finished Piston which gives a better contact with the cylinder wall than if the face of the Piston were ground.
- 8—It permits finish grinding of Pistons to size after the roughing cuts are taken, if the customer insists on grinding.

Are You able to do the Past Variety of Work Shown in this Photo—in Your Own Shop?



The Bulletins Listed Below Show How to Do Important Jobs in Auto Repair Shops. They are Free. Order by Number.



- No. 85 Piston Bulletin**
Machining oversize and semi-finished pistons on the lathe.
- No. 86 Valve Bulletin**
Turning and grinding valve faces. Straightening valve stems, etc.
- No. 87 Electrical Bulletin**
Truing commutators, undercutting mica, making bushings, etc.
- No. 88 Ring Gear Work**
Machining flywheels for starter ring gears and truing crankshafts.
- No. 89 Cylinder Regrinding**
Regrinding and reboring cylinders on the lathe.
- No. 90 Milling Attachment**
Milling and keyway cutting on the lathe.
- No. 91 Precision Grinding Bulletin**
External and internal grinding on the lathe.
- No. 92 Draw-in Collect Chuck**
The draw-in collect chuck attachment for fine, accurate work on the lathe.

- No. 93 The Lathe as a Screw Machine**
The lathe as a screw machine for making studs and small parts.
- No. 94 Turret Attachment Bulletin**
The lathe as a turret lathe for manufacturing.
- No. 95 Special Jigs and Fixtures**
Special jigs and fixtures for holding work on the lathe in manufacturing operations where accuracy and interchangeability of parts are required.
- No. 96 Taper Attachment Bulletin**
Boring and turning tapers on the lathe. Also the practical use of the center rest and follower rest.
- No. 97 Chucking Work on the Lathe**
The use of Independent, Universal and Combination Chucks for holding work on the lathe.
- No. 98 Other Lathe Attachments**
Various lathe attachments to insure accuracy and precision on a special machine work.

Job Instruction Sheets

Explain How to Do the Work Shown in Each Bulletin

The work outlined in each Bulletin is explained step by step in special Job Instruction Sheets supplied with each attachment, making it easy for the mechanic to do the work.



How to Run a Lathe

An Authoritative Manual Containing Over 300 Practical Illustrations



In the 160 pages of *How to Run a Lathe*, the best and most practical methods of the fundamentals of modern lathe practice are put at your service.

Price 25¢

How to Run a Lathe furnished free with Lathe or Attachment orders

South Bend Lathe Works
725 East Madison St., South Bend, Indiana

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