

QUICK CHANGE GEAR BOX Continued

Part No.	Name Of Part	List Price	Part No.	Name Of Part	List Price	Part No.	Name Of Part	List Price
Q 517	20-T. Drive Gear	.270	*SP 416 (SP 441)	5/16-18x1" Socket Hd. Cap Screw (3)	.15	*SP 524 (SP 521)	5/16-18x1" Socket Hd. Cap Screw	.10
Q 543	Turner Lever Hinges	.06	*SP 424 (SP 462)	5/16-18x1" Socket Hd. Cap Screw (3)	.15	*SP 213 (SP 239)	10-24x3/8" Socket Hd. Cap Screw (15)	.08
Q 544	Turner Plate	.90		Cap Screw (extending bolts) (2)	.35	*SP 1517 (SP 1227)	1/8x1/8" Groove-pin	.03
Q 405 (Q 462)	Turner	.15		Cap Screw (extending bolts) (2)	.35	*SP 846 (Q 468)	1/8x1/8" Special	.03
SP 500	1/2-20x1/4" Socket Set	.06	*SP 1522 (SP 1232)	1/4x1/4" Groove-pin	.03	*SP 1530 (Q 464)	1/4x1/4" Pin (1)	.03
*SP 1400 (SP 1328)	Gte. St. older (2)	.10	*SP 1521 (SP 1231)	1/4x1/4" Groove-pin	.03	*SP 1528 (Q 464)	1/4x1/4" Threaded Paddle Stop Pin (1)	.03
*SP 1520 (SP 1230)	1/2-20x1/4" Groove	.03	T1 (3)		.03			

*Indicates a combined assembly, or any change in part or design. Order part by the number in bracket ().

METRIC

SPINDLE SPEEDS

Standard and Quick Change

BACK GEAR	DIRECT DRIVE
50	250
73	437
134	700

Metric Transposing Gears, quadrant, metal gear chart and additional change gears for cutting from .2 to 6. MM pitch threads on Clausing Standard lathes. CATALOG NO. 1037 \$12.00

Metric Transposing gears, quadrant, metal gear chart and change gears for cutting from .75 to 6. MM pitch threads on Clausing Quick Change lathes. CATALOG NO. 1038 \$12.00

Standard gear cover to replace Quick Change gear cover (needed on converted Quick Change lathes). CATALOG NO. DL115-S DL-117 \$8.90

Inconverting an English Quick Change Lathe, much of the quick change feature is lost. This is not characteristic of the Clausing lathe, only, but all regular quick change lathes.

Metric Parts for Either Standard or Quick Change Lathes

M-110	Metric Cross Slide Lead Screw, 2 MM pitch	\$2.25
M-111	Metric Cross Slide Lead Screw Nut	\$1.00
M-114	Metric Compound Lead Screw, 2 MM Pitch	\$1.25
M-115	Metric Compound Lead Screw Nut	\$.75
M-132	Metric Micrometer Collars	\$.50

Cut "Near" Metric Threads Without Conversion Gears

By using a 17-tooth and a 23-tooth steel gear, a number of "near" metric pitch threads can be cut on Clausing quick change lathes without the use of conversion gears. These threads are not exact but are usable for commercial purposes. If you desire to cut these threads use the following schedule:

Use Stud Gear With:	Set Gear Box	Actual Result Will be:	Thread Use for MM
17-teeth	4 threads	.5997 MM	6.
23-teeth	6 1/2 threads	4.993 MM	5.
17-teeth	6 threads	3.998 MM	4.
17-teeth	8 threads	2.998 MM	3.
23-teeth	10 threads	1.998 MM	2.5
17-teeth	12 threads	1.999 MM	2.
17-teeth	16 threads	1.499 MM	1.5
23-teeth	26 threads	1.099 MM	1.25
17-teeth	28 threads	.999 MM	1.
17-teeth	32 threads	.749 MM	.75
17-teeth	48 threads	.499 MM	.5

M-118 17-tooth Gear \$1.80

M-119 23-tooth Gear 2.00

Full Information, Please . . .

YOU can be assured of the best possible service on replacement parts if you give full information regarding the part or parts wanted. Give the part number, name of part, and price. Always give serial number of lathe, and all finders, and part numbers stamped on top or head at tailstock end. All SP numbers in this book indicate standard parts, such as bolts and nuts, and we ask that such parts be obtained locally if possible. The minimum order on SP items is twenty-five cents, unless purchased with other parts, in which case the price of 3 or 6 cents prevails. If SP items alone are ordered, they should total the 25-cent minimum. All prices apply only to replacement parts—prices cannot be used in calculating the price of any assembly "less" used certain parts.

CLAUSING MFG. CO.

235 RICHMOND AVENUE
OTTUMWA, IOWA, U. S. A.

INSTRUCTIONS AND PARTS LIST

CLAUSING

CLAUSING LATHES

Four Models:

★ STANDARD

★ DUAL

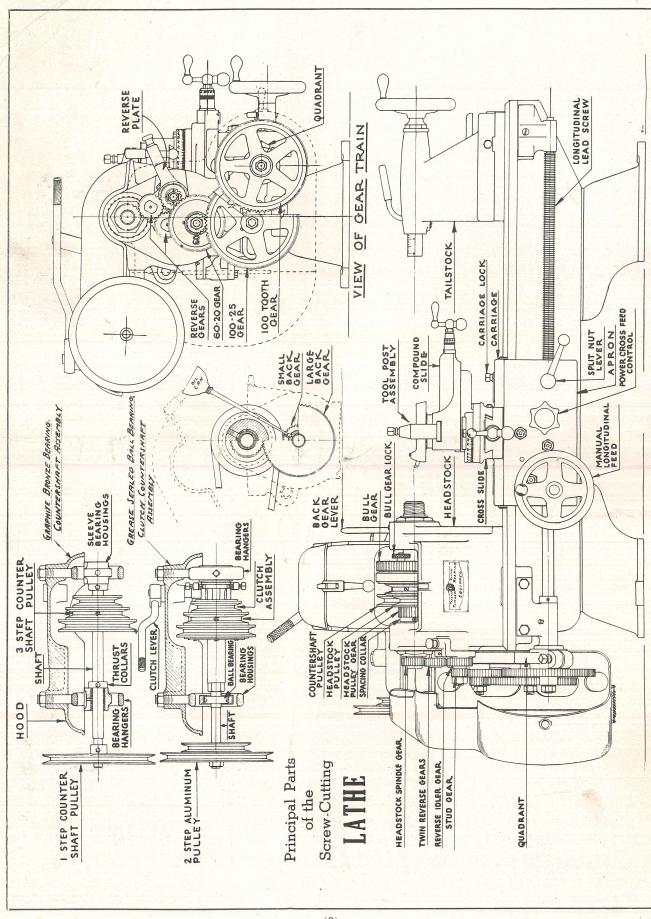
★ QUICK CHANGE

★ DUAL QUICK CHANGE

... All 12-Inch Swing
Back-Gearred Screw-Cutting
... with Modifications
to Fit Every Turning Need

CLAUSING MFG. CO.

235 Richmond Ave., Ottumwa, Iowa—U. S. A.



Principal Parts
of the
Screw-Cutting

(2)

INSTALLATION

**HOW TO MOUNT YOUR
CLAUSING LATHE AND
CHECK FOR ACCURACY**

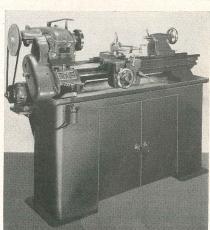
YOU have purchased a precision screw-cutting lathe. It is well designed, carefully made and convenient to operate. Properly installed and given reasonable attention, it will hold its inbuilt accuracy over a considerable period of years.

SETTING UP ALL Clauzing lathes have four-point mounting and can be installed on any level metal bench top or concrete. If a wood top is used, it should be no less than $\frac{1}{4}$ inch thick, select stock. A bench top height of 28 inches is recommended. The bench top should be $\frac{3}{8}$ inch from bolts or lag screws. The bed bolts must not be pulled down tight on a rough or warped bench since "drawing down" the bed will distort the lathe bed. The lathe bed itself must be absolutely level, for otherwise its weight will cause deformation of the lathe bed and a time consuming adjustment will be necessary. Check carefully with a precision level, crosswise at both ends of the bed and lengthwise at the center. Adjust the bed until it is perfectly level, either the lathe itself or the bench or legs on which it is mounted. Take time and pains on the installation if you want your lathe to last.

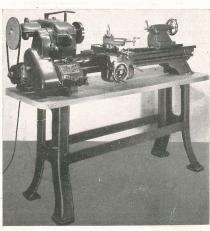
MOTOR CLAUSING Standard and Quick Change Lathes operate satisfactorily with $\frac{1}{2}$ or $\frac{1}{3}$ h.p. motor. The Dual and Dual Quick Change require $\frac{1}{2}$ or $\frac{1}{3}$ h.p., this being necessary for power on the higher speeds. A capacitor type motor is ideal since it permits easy installation of a current switch. Any type of motor except split phase can be used, the motor is mounted at the rear of the lathe, on or below the bench top. It is advisable to use two or three $\frac{1}{2}$ inch shims under the motor to permit belt adjustment, since any belt will slip if the motor is mounted directly on the base plate for the motor switch is on the lathe side

place for the motor switch is on the left side where it is out of the way and less likely to be turned on accidentally. A reversing switch (Cat. No. 2050) is preferable since there are many jobs in tapping, grinding, etc., where it is necessary or convenient to reverse the spindle. However, a plain on-off switch of any type is practical for most work.

OILING FOLLOW the oiling chart that is enclosed with this booklet. Even before you use the lathe for the first time, oil all the places indicated on the chart. No. 10 motor oil or equivalent should be used. Oil regularly and completely—it is the only way to keep your lathe in good condition. Wipe the bed and all polished



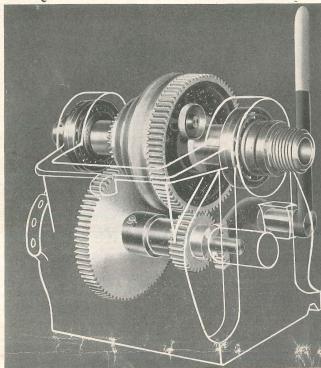
CHECKING ACCURACY THE factory test card attached to your lathe is a record of accuracy tests made immediately before shipment. Your lathe is identified by a serial number stamped on the base. A number of accuracy tests on your lathe is kept on file at the factory, and any reference to the accuracy of your lathe should mention these tests. The factory tests should have the precision equipment necessary to recheck fully on accuracy tests, but under normal conditions of shipment the test figures are accurate enough. A worthwhile recheck which tests the alignment of headstock with tailstock is shown in the following diagram. Unless the headstock is perfectly parallel with the bed, the lathe will turn tapered work. Chuck diameter, letting it project about 4 inches from chuck. Turn the piece so that the shoulders are rotated at either 90° or 180°. Measurements are made to show both shoulders the same diameter. Providing the chuck jaws are parallel, and error of .001 in. is acceptable, the error may be history of the lathe.



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OPERATION

HOW TO OPERATE AND ADJUST CLAUSING DUAL AND STANDARD LATHES



in mounting, and a careful recheck should be made. Rechecking the carriage accuracy is easily done by taking a light cut across the faceplate and then testing the plate with a straight edge.

STANDARD and Dual Lathes are back-gearred, screw-cutting lathes with independent gears which are substituted as needed in gear train to obtain proper carriage speed for a certain number of threads per inch or a corresponding rate of travel for turning. The Standard model has 11 in., the headstock countershaft while the Dual has ball bearing countershaft fitted with friction clutch. In other respects the two lathes are the same.

THE HEADSTOCK is the driving mechanism of the lathe. The headstock spindle is fitted with a three-step pulley so that three direct-drive speeds—250, 437 and 700 rpm—can be obtained. The automatic slackening of the belt when the hood is lifted makes belt shifting easy. The back gears are mounted below the spindle, and when these are engaged it is possible to obtain three back gear speeds—50, 73 and 134 rpm.

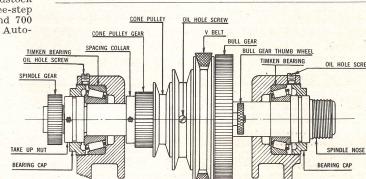
HOW BACK GEAR WORKS REFER to the photo at top of page for an understanding of the various spindle speeds. The large gear on the spindle is the main gear and it is keyed solidly to the spindle. The small gear on the spindle is fastened securely to the pulley and the combined gear-pulley floats on the spindle, that is, the spindle does not drive it. Now, when you want direct drive it is necessary to clamp the pulley

gear to the pulley by turning the bull gear thumb wheel in a clockwise direction. The bull gear then turns with the pulley and the bull gear drives the spindle. To go into back gear raise the hood. Remove the headstock pulley by hand until the pulley is completely up. Turn the thumb wheel counter-clockwise until the bull gear is free of the headstock pulley. Next, pull the back gear lever forward. It is usually necessary to turn the pulley pulley in one direction to get it into mesh. The drive is now from countershaft to headstock pulley, but the pulley does not drive the spindle. Instead, the motion is transferred to the large back gear and the small spindle gear. The small back gear drives the bull gear and the bull gear drives the spindle.

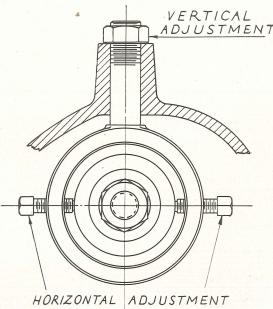
Refer to your own lathe. Note the oil cup on back gear shaft just below gear. You can so do that you can lubricate this weekly by turning the oil cup on back of headstock, the square head set screw which stops shift arm when back gears are in full mesh. Maintain this adjustment.

HEADSTOCK THE spindle has a $\frac{3}{8}$ inch through hole ground to No. 3 Morse taper with No. 3 Morse taper shank can be used. Standard equipment includes a No. 3 to 2 reducing sleeve. You should make a knockout in the center of the spindle nose so that it can be bored or hard wood, $\frac{3}{8}$ inch diameter by 12 inches long. The spindle nose is threaded to receive faceplates and chuck. Do not use chuck or faceplate which are sometimes difficult to remove. Ordinarily, the chuck can be removed with a light sharp tug on the chuck wrench. If this fails, lock the bull gear to headstock pulley and draw the gear off the spindle. This locks the spindle. Then, using a wood block and hammer, tap gently on the jaws of the chuck.

BEARING ADJUSTMENT WHEN the lathe chatters easily and the spindle seems to be loose, tighten the bearing. Do this by removing spindle gear on the back gear and spindle. Then remove bearing cap. Loosen the set screw that holds the take-up collar nut. With a metal rod, turn the take-up collar until the spindle has a slight drag. Reassemble.



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locks one bearing hanger in place. The horizontal adjustment is used most, since this controls belt tension. Keep the countershaft parallel with the headstock spindle for proper belt tracking.

CLUTCH COUNTERSHAFT THE clutch countershaft runs on ball bearings which should be kept well lubricated (see page 7 for complete oiling instructions). If the ball bearings fail, they can be adjusted by tightening the nut on expanding clutch hub, as shown in drawing on page 9, locking the adjustment with second nut. Do not tighten clutch excessively as this puts an unnecessary load on the bearings.

Proper belt tension can be obtained by adjusting the countershaft backward or forward inside the bearing hangers.

Bearing hangers can also be raised or lowered after releasing set screw in hood and screw holding shift lever.

STANDARD THE longitudinal feed is engaged by putting the tool bit on the lever at right end of approach which uses split cross feed. Make certain that the split nut is fully closed—partial closing will ride the edges of the thread and can damage. The power cross feed is engaged by turning star wheel in center of approach. When the star wheel is turned, the carriage moves fully. No harm is done if the long and cross feed are engaged at the same time. Your tool bit will then travel at about a 45 degree angle. The hand longitudinal feed is through a gear train which engages rack on underside of bed.

THREAD DIAL THE thread dial shows when to close the split nut when cutting threads so that the tool bit will not split the thread but always track in the same groove. Each numbered division of the thread dial represents 1 inch of carriage travel. Engage the feed lever when the carriage makes one full dial come opposite the witness mark. If the dial should get out of alignment causing marks to register a little to one side of index mark, adjust by rotating gear slightly after loosening set screw (see drawing on page 12).

CARRIAGE GIBS are used at back and front of carriage to prevent clamping. The back gib is adjusted by backing off the lock hex nut, a slot is cut after which the actual adjustment is made with the slot head adjusting screws. The front gib is adjusted by turning the screw head to bring it to end of carriage.

At the right side of carriage is the clamp bolt which holds the carriage in one spot so that it cannot creep when facing or cutting off. The carriage is locked by the clamp bolt and the clamp bolt can be loosened before use.

SLIDE REST THIS is the top part of carriage consisting of a cross slide and compound slide. The cross slide gib should be adjusted for a facing fit, while the compound should be very stiff. The compound slide is fastened to the cross slide by two bolts held in slots in the compound body. By loosening the two of these bolts, the compound can be rotated. A scale on circular base reading 90 degrees on each side of center gives the degrees of rotation. When using such unit with the tailstock attachment, the compound is removed entirely. This is done by loosening the two nuts, at the same time lifting up on the compound until it comes free.

GEAR TRAIN SPEEDS of carriage travel can be obtained by multiplying the number of threads per inch per rev travel for power feed. A thread chart is attached to gear cover showing how gear train is set for various threads. The chart shows the carriage feed in threads per inch. The corresponding feed-per-rev is given in chart. The feed per rev is the feed per rev to both cross and longitudinal feed. As shipped from factory, you will find gear train in "D" position, also shown in drawing. The 60 and 29-tooth idler gears are supplied as combination gear, which simplifies setting up. The 25 and 100-tooth idler is likewise a

How To Use

THREAD DIAL

EVEN THREADS

... if same as lead screw, or any multiple, that is, 8, 16, 24, etc., engage at will with out reference to dial.

EVEN THREADS

... other than above, engage one and one-half of the dial.

ODD THREADS

... are cut by engaging on any of the numbered lines.

HALF THREADS

... such as 4½, engage on 1

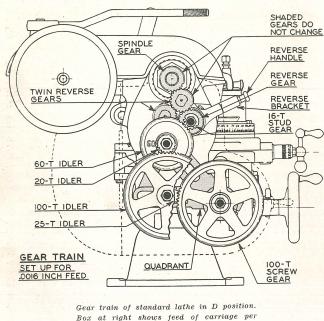
and 3 or 2 and 1, but not both.

QUARTER THREADS

... such as 5½, use any mark and return to the same mark for each cut.

INSPECT your own lathe. Note that the vertical adjustment of the countershaft must be adjusted to gear cover when carriage is run in gear train. The chart shows the carriage feed in threads per inch. The corresponding feed-per-rev is given in chart. The feed per rev is the feed per rev to both cross and longitudinal feed.

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combination. All other gears are single, including the two change gears. You will note from thread chart that the gear train can be set up in any of four positions. In

each position, the idler gear arrangement is the same but the stud and screw gears change. The idler gears are fitted over bushings, each bushing holding two gears. Two gears must always be mounted on each bushing regardless of whether or not they are used in the train. The clearance for the various gear trains is obtained by sliding the gear bolts in the slotted arms of quadrant, also by loosening the quadrant bolts so that the quadrant can be moved up or down as needed. A slight amount of clearance between meshing gears should be allowed to prevent binding.

REVERSE MECHANISM RIGID hand threads are cut with carriage moving toward the headstock; left hand threads are cut when carriage moves away from the tailstock. The direction of travel is controlled by the reverse handle, which has three positions—up, down and center. In center position the gear train is disengaged. In upper position, the carriage moves toward tailstock or the crossfeed is from front to back. In lower position, carriage moves toward headstock, or crossfeed from back to front. These movements apply only to A, C and D gear train positions. In position "B," the direction of travel is reversed.

Standard Power Feeds		
Threads	Gear Position	Feed per Rev.
600	D	.0016 inch
300	D	.0033 inch
240	D	.0040 inch
200	D	.0050 inch
160	D	.0062 inch
120	C	.0083 inch
112	C	.0088 inch
104	C	.0094 inch
96	C	.0104 inch
92	C	.0109 inch
88	C	.0114 inch
80	C	.0116 inch
72	C	.0139 inch

OPERATION

CLAUSING QUICK CHANGE LATHES

SIMILAR to the Standard lathe in many respects, the main differences in the Quick Change lathe are found at gear box and apron. Instead of having a stack of loose gears like the Standard lathe, all of the change gearing for the Quick Change lathe is enclosed in a gear box, and selection is made by means of two handles. The apron is considerably more complicated in design, the principal addition being a friction clutch.

LONGITUDINAL POWER FEED LONG power feed is first set by pulling the shift handle located at center of apron to "out" position. This in itself does not move the carriage, but only sets up the feed for carriage to move. If the feed is not readily rock the handwheel handle. Actual carriage movement is then obtained by turning the clutch star wheel in a clockwise direction. Carriage movement can be stopped by releasing the clutch. The carriage can be made to move in either direction along the bed by using the reverse mechanism at headstock. When the reverse handle is up, the carriage will move toward tailstock.

POWER CROSS FEED POWER cross feed is set by pushing shift handle in "in" position. The gears do not mesh ready to rock the hand cross feed handle. Actual carriage movement is then obtained by engaging the clutch. The carriage can be made to move either forward or back by means of the reverse lever. When the reverse handle is up, the cross feed is toward the back of the lathe.

THREAD FEED THREAD is controlling threads, the carriage movement is controlled by the split nut lever. The friction clutch shift handle is first moved to center position, which puts the power feed in neutral position. The split nut lever at right end of apron can then be pulled

up to lock the split nut around the lead screw for carriage movement. The carriage can be made to travel in right or left by using the carriage lever at the headstock. When reverse lever is up, the carriage moves toward headstock, cutting a right hand thread. It will be noted that the carriage movement opposite to that obtained when using friction clutch.

REMOVING APRON IT IS good practice to remove the apron at regular intervals for cleaning and inspection. To do this, remove the four socket head screws holding apron to saddle. Then, by lightly screwing on a spanner wrench, the apron can be removed after sufficient dismantling. If, however, it is necessary to remove apron entirely, first remove bracket holding and lead screw. After tilting apron forward, it can be pushed to right and then the carriage can be moved to the left. The idler wheel and cross feed handles to get gears into mesh; also be sure that locating pins are seated before drawing up socket head screw.

GEAR BOX THE gear box houses all of the change gearing of the quick change lathe, and permits eight different thread feeds. All of the changes are tabulated on the thread chart attached to front of gear box. For example of setting, say that you want to cut 32 threads per inch. First, find 32 on chart and locate the hole in front of gear box directly below the column in which 32 appears. Release the tumbler lever by depressing the thumb lever. Turn the thumb lever over and slide it over below the required hole. Pull up on the tumbler lever and release the thumb lever to let plunger snap into hole. Finally, note that clutch shift handle must be in "out" position to obtain a feed of 32 threads per inch. The design of the Clousing gear box permits changing gears while the lathe is running, and this procedure is recommended. If gear box set-up is made with lathe not running, rotate the lead screw with your fingers to get the gears into mesh.

The split nut lever at right end of apron can then be pulled

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GEAR TRAIN AFTER setting up the lathe, remove fixed guard at outboard end of headstock and inspect gear train. All gears in the train are permanent and are not removed except for repair or adjustment. The twin reversing gear is the same as standard lathe. The knurled sleeve at center of train is the sliding gear handle. This fits over the gear and is pushed back to "out" position. The gear train with sliding gear in is eight times as fast as with sliding gear out. While the guard is off, touch the gears lightly with graphite grease. Note off the various oiling points.

TAILSTOCK THE tailstock is the same as Standard Lathe. The spindle is locked by friction plates worked by a handle at rear of tailstock, the handle being pulled forward to lock and pushed back to release. The tailstock fits over the gear box and is adjusted by a locking nut and then rotating handle so that locking point comes slightly forward of center.

FEED RATE NEW operators are advised to experiment a little with the gear box to become acquainted with feed rates. Start by setting the gear box to 32 threads, which gives a carriage feed rate of .0046 inch per revolution of gear. This is a medium feed. It will take off quite a heavy chip with any style of roughing or turning bit; also, with a square nose bit, it is a good feed rate for finishing with a fine cut. However, if the gear box has been left position and the carriage feed rate will be immediately cut in half. Swing the clutch handle to right position and the feed rate will be halved again. Now, stop the lathe. Push clutch handle to left. Let clutch handle remain in "right" position. Start the lathe. You will now find the tool bit taking a rough bite of .009 inch per revolution of work. This is about as fast a carriage feed as is ever used in metal cutting. However, just to prove the action, you can swing the clutch handle to left and then center. Don't take a feed cut in these positions, since the carriage really "walks." The carriage feed rate will be cut to .0046 inch per revolution of work—sixty times slower and finer than the fastest carriage feed. If the end of the carriage is being machined using long feeds, the exact ratio is 3/10 to 1. Expressed in round figures, the cross feed is three times as slow as the corresponding long feed, or one-third the long feed as shown on chart. For example, if the carriage feed is .0046 inch, the cross feed will be .0015 inch per revolution of work. Here, again, a little experimenting will quickly acquaint the operator with the various feed rates which can be used.

OILING Your Quick Change LATHE

USE the lubrication chart of Standard Lathe (enclosed) as a general guide. Regular motor oil, No. 10 or 20, is recommended for all oiling. Additions to or changes in the oiling system are as follows:

GEAR TRAIN: All oiling points behind guard can be reached through holes drilled in guard. Sliding gear has Zerk fitting and should be shot with grease gun monthly, using automotive chassis grease. Sealed gears has oil cup fitted on quadrant. Gear box reverse handle and oiling point at end of reverse gear studs are same as Standard Lathe.

GEAR BOX: Two oil cups on top of box permit oil to drip on gear cone which distributes it generally to all moving parts. Gears can be greased if desired, working from under open side of gear box. Gear box reverse handle and oiling point at end of reverse gear studs are same as Standard Lathe.

APRON: Oil cup on face of apron leads to reservoir which supplies lubrication for entire apron. Initial filling is not easily done by loosening the cap and pouring oil in. Use a funnel or running oil into crankcase through opening at back of apron behind handwheel. Fill to overflow level of oil cup, 12 oz. (3/4 pint) of oil required. Maintenance is periodic during through oil up. Crankcase can be drained by removing plugs at bottom of apron.

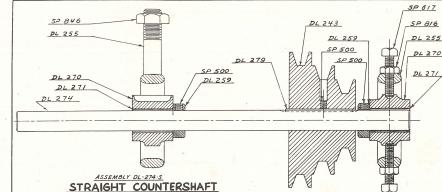
CLUTCH COUNTERSHAFT: Oil holes in each bearing housing should have shot of oil every twenty hours. Pulley is oiled by removing set screw—give several shots of oil every ten hours. Keep slip ring of clutch closer oiled.

REPLACEMENT PARTS

STANDARD AND
• QUICK CHANGE
LATHES

STRAIGHT COUNTERSHAFT

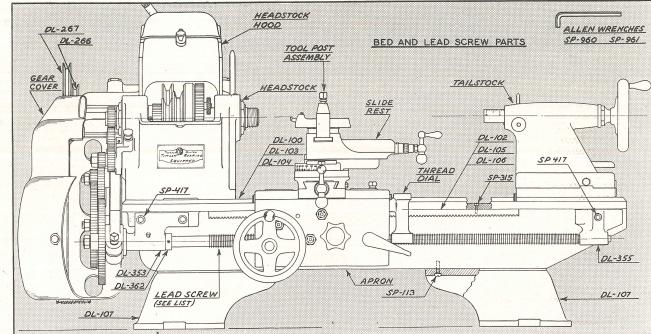
Part No.	Name Of Part	List Price
DL 243	3-Step Pulley	\$ 4.80
*DL 255 (DL 255-8)	Bearing Hanger	1.50
DL 259	Spac. Collar (2)	.30
*DL 270 (DL 270-8)	Counterbore Assm.	1.20
DL 271	Bronze Bushing (2)	.75
DL 274	Countershaft	1.20
DL 274-8	Comp. Counterbore Assm.	12.75
DL 279	Comp. Pulley Key	.10
DL 304	3/16" Drive Pulley Key	.06
SP 560	1/4" set screw (2)	.08
*SP 617 (SP 618)	5/16"-18X1 3/4" Sq. Rd. Set Screw (2)	.03
*SP 816 (SP 840)	3/8" Jam Nut (4)	.03
*SP 846 (SP 870)	5/8"-18 Hex. Jam Nut (4)	.03
SP 616	5/16"-18X1 3/4" Sq. Rd. Set Screw (2)	.03



REPLACEMENT PARTS Continued

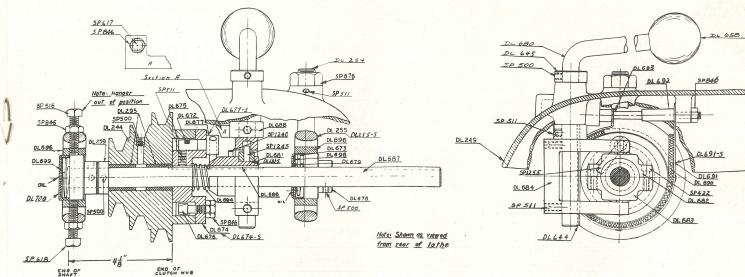
Part No.	Name Of Part	List Price	Part No.	Name Of Part	List Price	Part No.	Name Of Part	List Price
BED AND LEAD SCREW								
DL 100	36" Bed	-\$.60	*SP 417 (SP441)	5/16" x 183" Screw		DL 681-S	Clutch Pusher	
DL 102	36" Rack	-\$.60	SP 960 (SP990)	8 1/4" (1)		DL 681-S	Assembly, DL	
DL 103	18" Bed	-\$.60	SP 961 (SP991)	1 1/4" Allen	-\$.15	DL 682	Pusher	3.65
DL 104	24" Bed	-\$.60	SP 961 (SP991)	Wrench	-\$.10	DL 682-S	Slip Ring Assembly, DL	1.20
DL 105	18" Rack	-\$.60	SP 961 (SP991)	5/16" Allen	-\$.10	DL 683	U Nut	1.00
DL 106	24" Rack	-\$.60	SP 961 (SP991)	Wrench	-\$.10	DL 686	Clutch Pusher	.05
DL 107	Bed, Feet 2	-\$.60	SP 961 (SP991)	Wrench	-\$.10	DL 687	Clutch Shaft	.50
DL 108	18" Lead Screw	-\$.60	SP 961 (SP991)	Wrench	-\$.10	DL 687-S	Complete Clutch Assembly, 4-lets	
DL 111	24" Lead Screw	-\$.60	DL 212	1/2" x 183" Key For Align. Pulley	-\$.05	DL 688	Brake Push Arm	.45
DL 269 (DL 211)	2 8 1/2" Aluminum	-\$.60	DL 244-S	Pulling & Building Assembly, DL	7.00	DL 688	Brake Band	.35
CLUTCH COUNTERSHAFT								
DL 267 (DL 211)	8" Steel Pulley 1/4"	-\$.60	DL 255-S	Bearing, DL	1.50	DL 692	Brake Band	.35
DL 267 (DL 303)	8" Steel Pulley 1/4" (Clutch Counter-shaft)	-\$.60	DL 256	Spacings Collar	.40	DL 693	Brake Pad Rod	.35
DL 268	1-3/4" Pulley, 1/4"	-\$.60	DL 295	Pulling Collar	.45	DL 694	Anti-rungage	.10
DL 269	1-3/4" Pulley, 1/4"	-\$.60	DL 672	Drive Bushings	.25	DL 695	Spring	.10
DL 270	1-3/4" Pulley, 1/4"	-\$.60	DL 673	Drive Ring	.15	DL 698	Bearing Housing	1.00
DL 280-S	Bore	-\$.60	DL 674	Felt Retaining Ring	-\$.10	DL 699	Felt Washer	.05
DL 281-S	1-3/4" x 5" Pulley, 1/4"	-\$.60	DL 674-S	Clutch Expander Bush	-\$.20	DL 700	Felt Washer (Close End)	.05
DL 281-S	1-3/4" x 5" Pulley, 1/4"	-\$.60	DL 675	Clutch Hub Assembly, DL	6.50	DL 700-S	Closed Bearing Cover	
DL 282-S	1-3/4" x 5" Pulley, 1/4"	-\$.60	DL 676	Expanding Clutch Assembly	1.40	DL 708	Ball Bearing Housing Assembly, DL	
DL 353	Leadcrew Brack- et (Head)	-\$.60	DL 677-S	Expanding Clutch Adjusting Bolt	.50	DL 680-S	Clutch Shift Ball	.60
DL 355	Leadcrew Brack- et (Tail)	-\$.60	DL 678	Clutch Expander	1.55	DL 681	Shift Key	.05
DL 356	30" Leadcrew	-\$.60	DL 677-S	Leadcrew Collar	1.75	SP 610	Ball Bearing	2.55
DL 362	Leadcrew Collar	-\$.45	DL 678	Open End	2.55	SP 618	5/16" x 183" Sq. Hd. S.	.05
DL 555	Leadcrew Collar	-\$.45	DL 679	Open End	3.00	SP 618	5/16" x 183" Sq. Hd. S.	.05
Q 442	Leadcrew	-\$.60	DL 679-S	Ball Bearing	3.00	SP 618	5/16" x 183" Sq. Hd. S.	.05
Q 443	24" Leadcrew	-\$.60	DL 679-S	Cover	3.00	SP 618	5/16" x 183" Sq. Hd. S.	.05
Q 444	30" Leadcrew	-\$.60	DL 679-S	Leadcrew	3.00	SP 618	5/16" x 183" Sq. Hd. S.	.05
*SP 113 (SP190)	Phillips Flat Hd.	-\$.05	DL 679-S	Leadcrew	3.00	SP 846	5/16" x 183" Sq. Hd. S.	.05
DL 315 (SP370)	Screws (8)	-\$.05	DL 679-S	Leadcrew	3.00	SP 876	5/16" x 183" Sq. Hd. S.	.05
DL 681	Expanding Clutch	-\$.05	DL 681	Pusher	2.50	SP 500	1/4" x 20x1/4" Stock & Set Screw (11)	.05

*Indicates a combined assembly, or any change in part or design. Order part by the number in bracket ().



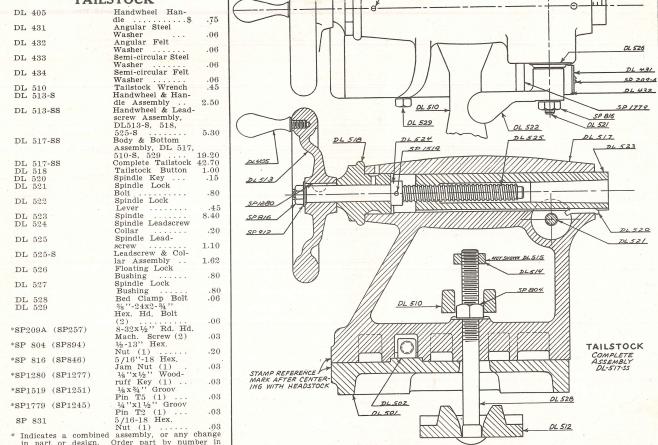
(8)

● CLUTCH COUNTERSHAFT ● TAILSTOCK



Part No.	Name Of Part	List Price
*SP 511 (SP 510)	5/16" x 183" In Head Assembly	-\$.10
SP 511	5/16" x 183" Socket Set Screw (4)	-\$.10

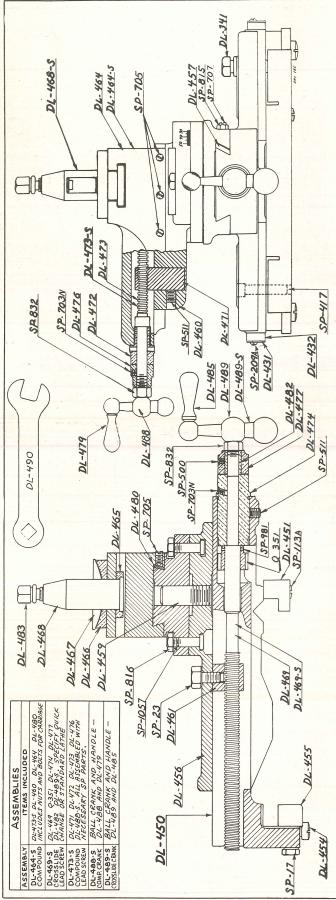
TAILSTOCK



(9)

*Indicates a combined assembly, or any change in part or design. Order part by number in bracket ().

● CARRIAGE

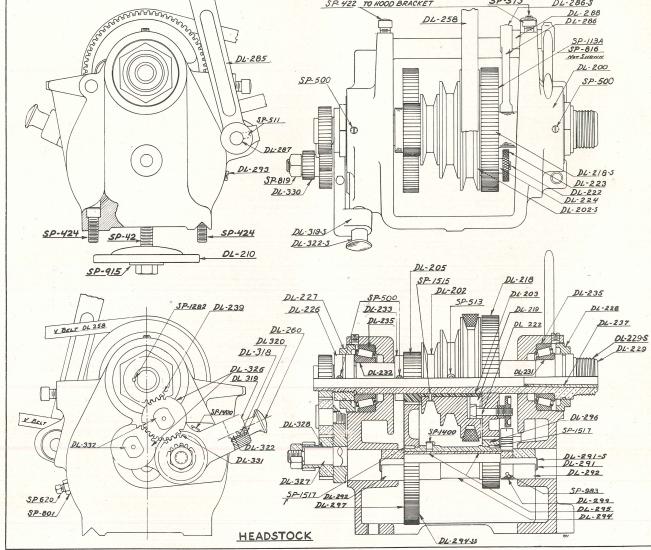


STANDARD AND QUICK CHANGE CARRIAGE

MAGAZINE OF THE AMERICAN MUSEUM OF NATURAL HISTORY

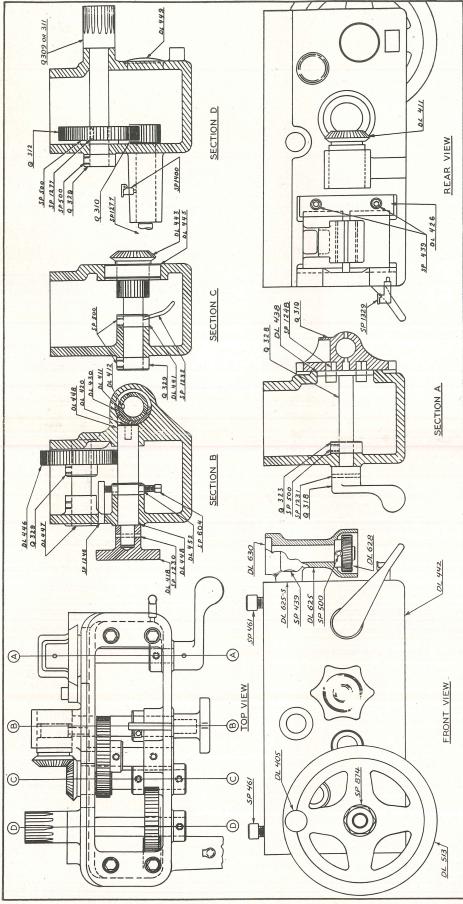
Indicates a combined assembly, or any change in part or design. Order part by the number in bracket ().

● HEADSTOCK ● HOOD



*Indicates a combined assembly, or any change in part or design. Order part by the number in bracket (11)

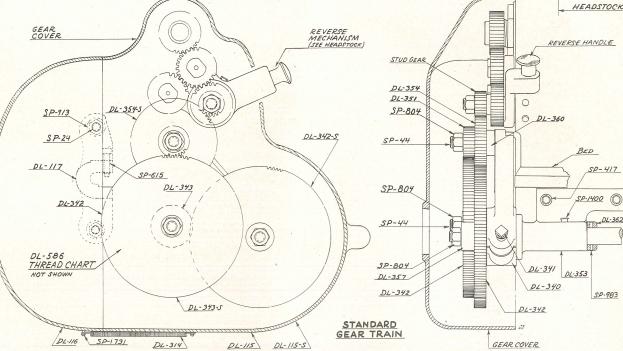
● STANDARD APRON



(12)

STANDARD APRON

● GEAR TRAIN



STANDARD GEAR TRAIN

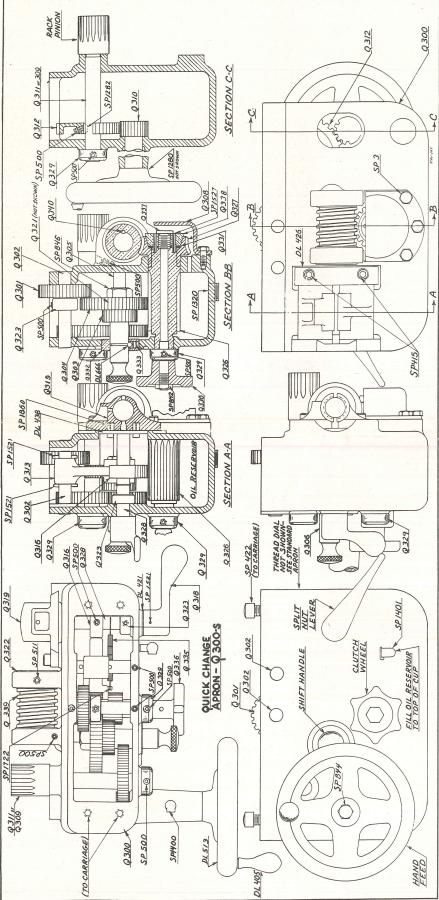
QUICK CHANGE GEAR TRAIN

QUICK CHANGE GEAR KITS					
Part No.	Name of Part	Each	Part No.	Name of Part	Each
DL 577	64 Teeth	\$ 1.50	Q 455	Sliding Gear Index Spring	...\$.03
DL 578	60 Teeth	1.50	Q 456	5/16" Steel Gear	...\$.03
DL 579	56 Teeth	1.50	Q 457	2/3" Special Hex Nut	...\$.03
DL 580	52 Teeth	1.50	Q 525	14" Gear	1.50
DL 581	48 Teeth	1.50	Q 526	7/8" Gear	2.60
DL 582	44 Teeth	1.50	Q 528	60-T Gear	1.80
DL 583	44 Teeth	1.50	Q 529	18-T Gear and Handle	4.50
DL 584	40 Teeth	1.50	Q 530	75-T Gear	2.70
DL 585	32 Teeth (2 need)	1.50	Q 531	Sliding Gear Stop Disk	...\$.03
DL 590	36 Teeth	1.50	Q 532	Quadrant Stud Bolt	1.20
DL 591	54 Teeth	1.50	Q 533	Sliding Gear Stop Disk	.20
			Q 534	30-T Gear and Hub	3.00
			Q 535	Quadrant	3.60
			Q 536	Gear Cover	...\$.70
			Q 537	Gear Cover Stud	...\$.06
			SP 36-A	(SP 401) 165-162 1/4" hex bolts	...\$.06
			SP 41-B	(SP 402) 7 1/4" hex bolts	...\$.09
			SP 41-E	(SP 4413) 5/16-18X1 1/2" hex screws	...\$.15
			SP 817	(SP 847) 3/16-hx. in. nt. (3)	.03
			SP 836	(SP 866) .18-hx. in. nt.	.06
			SP 844	(SP 874) 1/2-hx. in. nt.	.03
			SP 1400	(SP 1400) 1/2" hex cap screws	.10
			SP 1404	(SP 1330) 5/16 Zerk	.15
			SP 1517	(SP 1223) Dr. Set.	.07
			SP 943	% wash. (not shown) (3)	.06

*Indicates a combined assembly, or any change in part or design. Order part by the number in bracket ().
(12)

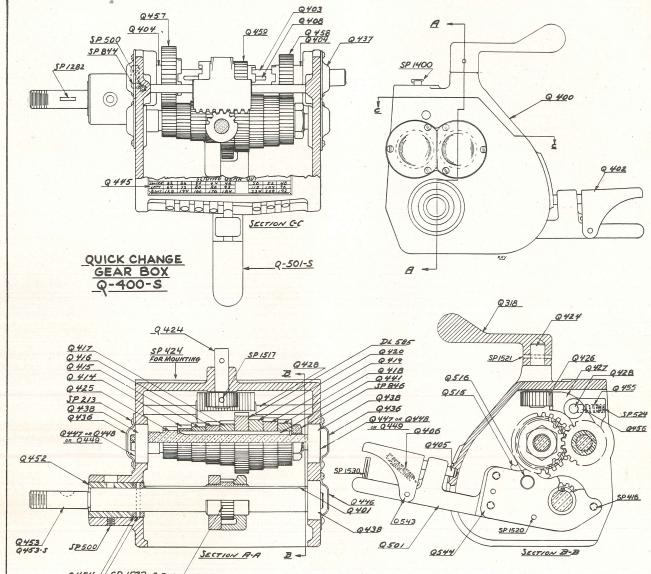
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● **QUICK CHANGE APRON**



(14)

● QUICK CHANGE GEAR BOX



QUICK CHANGE GEAR BOX

Part No.	Name of Part	List Price	Part No.	Name of Part	List Price	Part No.	Name of Part	List Price
DL 585	32-T Cone Gear	\$.150	Q 418	18-T Cone Gear	..1.00	Q 448	Adjusting Washer	..03
Q 400	Shift Lever Body	\$.150	Q 420	24-T Cone Gear	..1.00	Q 449	Adjusting Washer	..03
Q 4008	Complete Gear Box	70.00	Q 424	Clutch Shift Shaft	..20	Q 450	1/16" Tumbler	..03
Q 451 (Q 451)	Keyway	..25	Q 425	Shift Lever	..4.50	Q 452	Tumbler Shaft	..45
Q 402 (Q 461)	Thumb Paddle	..20	Q 425-8	Gear	Q 453	Assy. Tumbler Shaft	..45	
Q 403	Thumb Cone Gear	..75			Q 454	Q 452, 453 Ass- embly	..45	
Q 403-8	Dog Gear Assembly	..75	Q 426	14-T Cone Gear	DL 855 = 13.70	Q 454	16-Tumbler Tumbler Colar	10
	Dog Gear Assembly	..75	Q 426	16-T Cone Gear	..26	Q 454	Slide Gear	10
Q 404	Assy. Shift Lever	8.00	Q 426-8	16-T Clutch Shift	..75	Q 456	Gear Index	..08
Q 409	Sleevs	..05		Gear	Q 456	Spring	..06	
Q 410	Adjuster Spacers	..05	Q 427	Dog Clutch Shoe	..1.85	Q 457	5/16" Steel Ball	..03
Q 470	Adjuster Spacers	..05	Q 428	Dog Clutch Shoe	Q 466-8			
Q 472	Sleevs (not shown)	..05	Q 436	Bar Cover	..35			
	Sleevs (not shown)	..05	Q 437	Closed Bearing Cover	Q 459 (Q 467)			
	Clutch Shoe	..35	Q 438	Open Bearing Cover	..10			
Q 405 (Q 460)	Timber Lever Spring	.06	Q 439	Open Ball	Q 501			
	Timber Lever Spring	.06	Q 440	20-ball (5) ..	Q 501-8 (Q 501-8)			
Q 414	18-T Cone Gear	..1.00	Q 441	Coax				
Q 415	20-T Cone Gear	..1.00	Q 443	Thread & Feed Cart				
Q 417	22-T Cone Gear	..1.00	Q 446	Closed Bearing Cover				
Q 417	23-T Cone Gear	..1.00	Q 447	Adjusting				
			Q 448	1/4" Bushing				
			Q 449	64/64" Bushing				
			Q 513	24-T "T" Number				
			Q 516	Tumbler				

*Indicates a combined assembly, or any change in part or design. Order part by the number in brackets. Continued

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