



CLICK ANYWHERE FOR MORE DETAILS

MANUAL PREVIEW

Climax

Operator's Manual

K, KU & KL

Engines

Operator's Manual

JENSALES.COM
or Call 800-443-0625



CLICK ANYWHERE FOR MORE DETAILS

THIS IS A MANUAL PRODUCED BY JENSALES INC. WITHOUT THE AUTHORIZATION OF
CLIMAX OR IT'S SUCCESSORS. CLIMAX AND IT'S SUCCESSORS
ARE NOT RESPONSIBLE FOR THE QUALITY OR ACCURACY OF THIS MANUAL.

TRADE MARKS AND TRADE NAMES CONTAINED AND USED HEREIN ARE THOSE OF OTHERS,
AND ARE USED HERE IN A DESCRIPTIVE SENSE TO REFER TO THE PRODUCTS OF OTHERS.

CLI-O-K SERIES

Instructions in the Care, Operation and Adjustment of Climax Engines

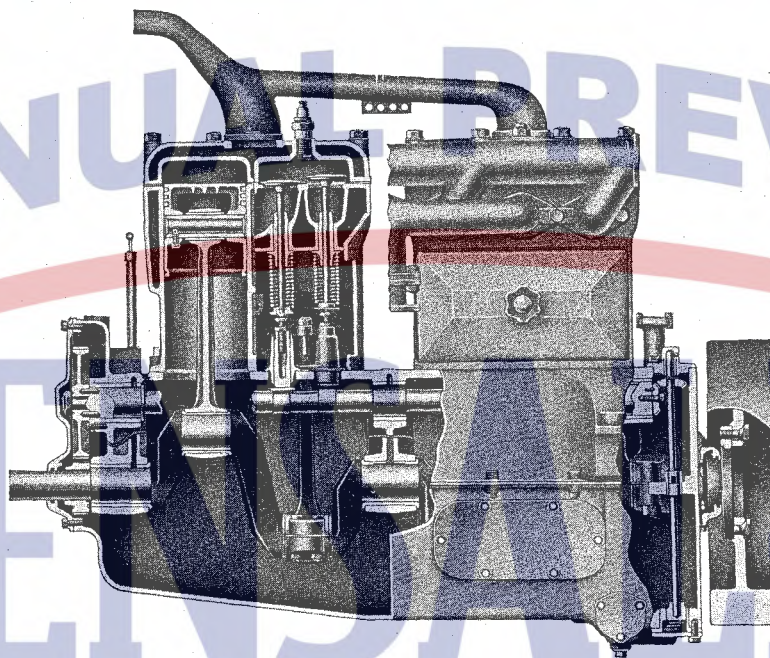


Fig. 1
Longitudinal Section "K" Series Engines

Lubrication System

The life of your engine depends, more than anything else, on proper lubrication. It must have plenty of good clean oil.

The damage done by poor or insufficient lubrication usually is difficult and expensive to repair, as it often means whole or partial rebuilding of the engine.

The supply of oil for the entire engine is carried in the base or oil pan. To fill oil pan pour the oil in through the covered oil filler on the side of the crank case. A hinged cover closes this oil filler.

The oil pan holds about two and one-half ($2\frac{1}{2}$) gallons of oil, but in filling it, be guided also by the oil level indicator at the rear end of the engine. When the ball in the glass tube reaches the top there is enough oil. Do not add any more oil. The connecting rods are not supposed to dip into the oil. The amount of oil can only be properly determined when the engine is nearly level, not standing on an angle.

For safety's sake refill when the ball is about midway between the top and the bottom of the glass tube.

This indicator ball is controlled by a cork float in the oil pan. If the engine is taken apart, be sure that the cork float goes back into the guides which hold it in place and see that it runs easily.

At frequent intervals, however, instead of adding to that already in the oil pan, the old oil should be drained out by removing the plug in the bottom of the oil pan and replaced by entirely fresh oil. When using kerosene for fuel, or when working where there is considerable dust and dirt, the oil should be completely drained out every two or three days,

but when gasoline is used and conditions are more favorable, once a week is sufficient.

If the amount of oil in the oil pan does not diminish as the engine is being used, it will mean it is being diluted by liquid fuel working past the pistons. If this is the case, all of the oil should be drained out at least every three days and entirely replaced, because, when diluted by liquid fuel its lubricating properties are entirely destroyed. It is a good plan, when draining the oil out, to occasionally remove the hand hole plates from the sides of the oil pan and wash it out with gasoline so that all of the accumulated dirt, etc., may be removed. Do not use waste or rags; a brush that does not shed bristles is better, and leaves no lint.

When cleaning out the oil sump, the oil strainer (See Figs. 1 and 2) through which all the oil passes before it is circulated through the engine, should be removed and carefully cleaned with a brush, using kerosene to rinse. To remove the strainer, remove the three cap screws which hold it in place in the right side of the oil pan. The oil strainer can then be removed and cleaned. When replacing same, care should be taken to see that the oil strainer body gasket is in good condition, and that the cap screws are well tightened.

There are many brands of gasoline engine lubricants on the market. Many of these have the proper lubricating value when used in Climax "K" Series engines; others should be avoided. The best oil for this purpose is a highly refined, acid free paraffin base oil with a specific gravity of at least 26 degrees Baume and a Saybolt viscosity of approximately 500 seconds at 100° Fahrenheit. We hesitate to recommend any particular brand of oil for Climax engine lubrication due to variations which have been found in some of the highly advertised oils, but the following include several well known

brands which may be relied upon: Havoline, Mobiloil, Quaker State, and Valvoline.

Use the lighter oils with gasoline fuel, and for lighter average loads—use the heavier oils with kerosene fuel and for continuously heavy loads. Usually, it is better to use a lighter oil in winter than is used in summer, as the oil has a tendency to become thick in winter when the temperature is low.

When starting the engine in cold weather, it should be run idle or light until the ball of the circulating oil indicator, located in front of number one cylinder, remains in the "up" position, indicating that the thick cold oil has been warmed up and is flowing freely.

oil pan where it is again circulated. Proper pressure is maintained by the oil pressure relief valve, the overflow from which is ejected upon the helical timing gears. The oil pressure indicator, located between the fan bracket and the front cylinder block, consists of a long tube fitted with a piston to which is attached the rod and indicator ball. The cylinder is directly connected to the main oil channel and when the pump is working properly and the line is under pressure the ball will be "up". Should the oil pressure fail the ball will drop and so indicate danger.

Lubrication of Electrical Units

The bearings of the magneto, starter, and generator (if the engine is equipped with them), should be lubricated

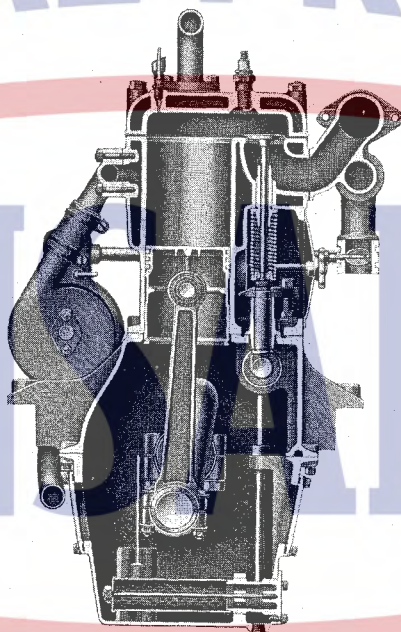


Fig. 2

Cross Section "K" Series Engine

The oil pump, next to the oil strainer, forces the oil to the different bearings in the engine, supplying an excess amount to each bearing and under a pressure of five to six pounds. By removing the flat plate under the oil pump, the pump can be reached and examined to note its condition.

The hardened steel vanes, which rotate in the eccentric chamber are separated by springs, and in overhauling the engine, these springs should be examined to be sure that they are in good condition.

The owner or operator of a gasoline engine should understand the operation of the oiling system because of the importance with which it is associated with the long life of the engine. By referring to Figures 1 and 2 the oil circulation through the "K" series engine can be traced. The oil pump is submerged in the oil supply in the oil pan. It draws oil through the oil strainer and discharges it under pressure through a vertically drilled hole in the oil pan to the main delivery channel which is at the parting line of the oil pan and the crankcase; the channel being in the crankcase and sealed by the oil pan. Drilled oil passages in the crankcase connect the oil channel with the main and camshaft bearings. The crankshaft is drilled so that the connecting rod bearings are lubricated by oil under pressure. The excess oil from the connecting rod bearings is thrown by centrifugal force upon the cams, valve lifters, and cylinder walls. The piston pin bearing is lubricated indirectly. All excess oil drains to the

weekly with a few drops of light engine oil. These units require only a small amount of oil, but this should be applied regularly.

Main and Connecting Rod Bearings

Normal wear calls for adjustments of bearings at proper intervals. Bearings which are allowed to remain loose will wear much more rapidly than if maintained in correct adjustment, and, in the case of the crankshaft, further damage to the crank and main bearing journals will result in becoming permanently "worn out of round". Once this occurs it becomes difficult to keep the bearings or bushings in shape for more than a short time without further adjustments.

Inspect the bearings regularly. A loose bearing generally produces a "knock" in the engine. Do not confuse an ignition or fuel knock for a loose bearing. The former is only apparent when the engine is running under full load at a low speed and confines itself to the cylinder head. Either the connecting rod or main bearings can be inspected through the hand hole plates on the side of the oil pan.

The bearings are all assembled with thin metal shims of different thicknesses. When adjustments are to be made remove the necessary number of shims from each side of the bearing, and then turn the nuts up tight, being sure to replace the cotter pins. Do not leave the caps loose, as they

must be drawn down tight on the shims. One way of adjusting the bearings is to take one at a time, removing shims and tightening up the cap until the crankshaft cannot be turned without difficulty. Then replace just enough thin shims under the bearing caps to allow the nuts to be drawn very tight without binding the bearings.

Valves

Watch the adjusting screws on top of the valve lifters. If too high, the valves will not seat, and will quickly burn up. About twelve thousandths of an inch (0.012") is the proper clearance between adjusting screw and lower end of exhaust valve stems when the engine is cold, and the intake valves should be set with ten thousandths (0.010") inch clearance. As the engine becomes hot, this clearance nearly disappears.

Valves require regrinding occasionally. Do not let them leak, as the power of the engine is reduced, and the valves themselves will burn and become useless.

Valve Timing

With the tappet clearance properly adjusted, the intake valve should start to open when the piston has traveled $\frac{1}{8}$ inch to $\frac{1}{4}$ inch from upper dead center on its down stroke. The other valve events will take care of themselves.

Ignition System

The ignition system on the "K" Series Engines consists of one high tension magneto, equipped with impulse coupling. To time the ignition turn over the engine until cylinder No. 1 (the farthest from the flywheel) is on top dead center on the compression stroke. The top dead center can be found by inserting a wire through the priming cock.

Set the magneto breaker housing lever (toward the outside of the engine) in full retard position by pulling it up as far as it will go. Set the magneto breaker points in a position where they are just ready to part. Tighten the magneto coupling screws. The engine firing order is 1-3-4-2. Attach the wires from cylinder No. 1 to the magneto distributor whose segment is in contact with the distributor arm. In the same direction of rotation as the distributor arm attach the wires to the distributor posts in the order 3-4-2.

Instructions for adjustments of the magneto will be found in the booklets furnished by their manufacturers.

Ignition troubles cause most of the failures or delays in the operation of gasoline engines, and therefore the operator should become thoroughly familiar with the ignition system. Spark Plugs should be kept clean and in good condition. Carbon on the porcelain will prevent the spark from jumping between the points. The points should be separated about 0.025 inch to 0.030 inch. It is recommended that a spark plug tester be employed from time to time to check up on the performance of the spark plugs. The plugs and ignition wires should be kept dry, as water and dampness will "short" them. Start the engine with the Spark Retarded, but advance it for regular running.

Pump

The only attention that the pump will require will be the occasional tightening of the packing gland screws. When a slight leak occurs due to the packing wearing, take up on the screws just enough to stop the leak. The water pump shaft can easily be ruined by taking up too tightly on the packing screws.

Carburetor

Instructions for adjustment of the carburetor will be found in the booklet furnished by the carburetor manufacturers.

Before the engine leaves the factory, the carburetor is adjusted so that just the proper portions of air and fuel are provided, but this adjustment will not take care of all temperatures or all grades of fuel. It may have to be changed from time to time to secure the best results.

The operator will probably spend some time and effort before he can get the most efficient adjustment of the carburetor.



Governor

All parts of the governor should work perfectly free. The least binding on the pins or in sliding on the shaft will result in irregular action of the governor. To test, disconnect the spring and move the different levers, etc., with the fingers. The slightest drag can be detected and then corrected. The butterfly throttle valve above the carburetor must be in correct relation to the small lever on the end of the throttle valve rod. The extreme motion of the governor towards "throttled down" position should not quite close the throttle valve, but stop about two degrees from horizontal, or closed position. A mark on the end of the throttle valve rod indicates the position of the throttle valve itself. If it becomes necessary to alter the adjustment, loosen the clamp screw in the small lever on the throttle valve rod, and turn the rod the necessary amount. A very slight variation in the setting at the closed position affects the action of the engine considerably, and it may be necessary to make several trials to secure the best results. Make the change in the setting but a very small amount each time.

Gaskets

Cylinder Head Gaskets in a heavy type of engine such as this require more attention than is necessary in the case of the automobile engine. When installing a new gasket proceed as follows: 1. Clean all surfaces. 2. Place gasket on cylinder with side marked top up, and shift on studs until all water openings index properly. 3. Put on head and draw the stud nuts down, beginning with the nuts in center portion of head until all are just bearing on head. 4. Tighten the nuts gradually working back and forth across, not around, the head, always keeping more tension on the nuts in center portion of head. Continue until all nuts are drawn down tight. 5. Run engine without load until thoroughly warmed up. Stop and go over all nuts again, beginning with the nuts in center portion of head. 6. Tighten nuts frequently and persistently for three or four days until the gasket is finally compressed and nuts can be turned no further.

Note—This latter procedure should be followed in the case of a new engine just going into service.

When heads are removed for grinding valves it is good practice to install new gaskets although frequently the old gasket can be successfully used again if it is not damaged and is carefully installed.

When hand hole plates are removed or other water or oil joints are broken be careful not to injure the gaskets.

To Start the Engine

Retard the spark by pulling the magneto breaker housing lever up as far as it will go. Set the impulse starter on the magneto unless it is automatic. If the engine has been standing more than a few minutes, pour a small quantity of gasoline through the priming cups in each cylinder. Set the choker of the carburetor about three-quarters closed. Throw out the engine clutch if it is fitted with one. If your engine is equipped with a starter (models KU or KL) press the starting switch button just long enough to get the first explosion of the engine. Release button immediately upon the engine starting. Open carburetor choke and advance the spark by pushing the magneto breaker housing lever down. Allow the engine to run idle until warmed up before applying load. If the engine does not start immediately do not let the starting motor continue to turn over the engine. Using the starting motor for more than a few seconds continuously will damage the windings and will run down the storage battery very quickly. When using the starting crank to start the engine, crank the engine with retarded spark and choke set three-quarters closed. Pull up on the crank handle. Do not push down on the starting crank. It is dangerous.

Suggestions

If the engine has been standing idle for some time, pour a little lubricating oil into each cylinder through the priming cups, and crank the engine over several times to re-establish the oil film.

In freezing weather, always drain all the water out of the engine and radiator when leaving it, as freezing will burst the water jackets and radiator. There are drain cocks in the pipe below the water pump and in the bottom of the radiator.

If the engine is operated in a dusty locality, some dust will enter the engine through the carburetor. Under such conditions a cleaner on the air intake to the carburetor will preserve the intake valves, valve seats, pistons, piston rings and cylinder walls, and save you many costly repair bills.

The engine crankshaft should not be subjected to end thrust.

Whenever possible, use soft water in the radiator to avoid deposits of lime, which is an insulator and will cause engine to overheat.

Reduce the speed of engine when idling, using throttle valve on carburetor.

Caution

Do not idle engine for long periods as this promotes oil pumping, carbon and fouled spark plugs.

DON'T'S

Don't fail to prime each cylinder with a teaspoonful of gasoline before starting, unless the engine has been stopped for a few minutes only.

Don't over-prime your engine—this only makes starting more difficult.

Don't try to redesign the entire carburetion system which has been worked out by the engine manufacturer.

Don't crank the engine either by hand or with the starting motor unless the spark is retarded. It is dangerous.

Don't fail to set the impulse starter on the magneto for starting before cranking, unless this is automatic.

Don't fail to keep the oil at the proper level.

Don't fail to change over to gasoline just before stopping, when running on kerosene, so that it will not be necessary

to drain the carburetor (if a single carburetor is used) and refill it with gasoline. The engine won't start on kerosene, even if it has cooled off only a little bit.

Don't run the engine without an efficient air cleaner on the air connection to the carburetor when the engine is being run where there is excessive dust and dirt. The engine will be ruined without it.

Don't let the spark plugs get dirty. If a cylinder misses, examine the plug.

Don't let an excess of carbon accumulate in the cylinders. Carbon accumulates fast if the carburetor is not correctly adjusted or if kerosene is used when the engine is not hot enough.

Don't fail to drain the water from the engine and radiator in freezing weather.

Don't let the engine get so dirty that you can't tell if nuts or cap screws are getting loose. On dirty engines they drop off and are lost.



Flywheel Group

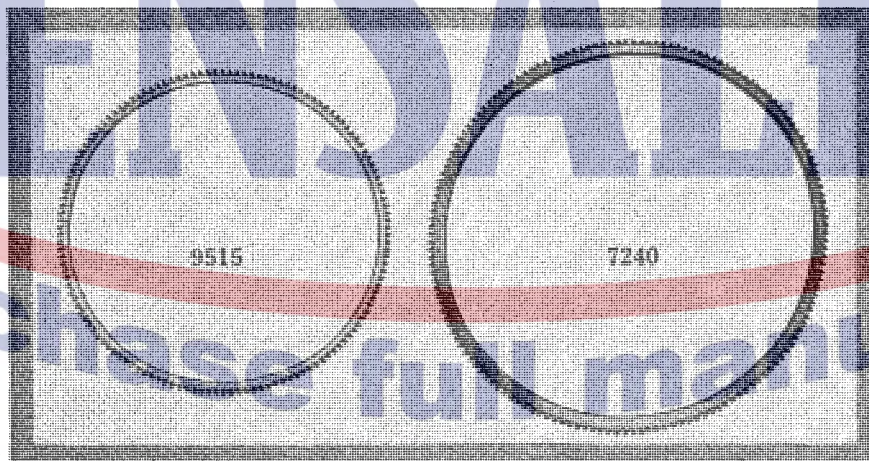
Part No.	NAME	No. per Engine	Price Each
	Flywheel (Suitable to Receive Any Standard Make of Clutch).....	1	Price on Application
Note—Flywheel and Flywheel equipment is furnished to suit our customers. When Ordering Be Sure and Give ENGINE NUMBER AND MODEL which can be found on Name-Plate of Engine.			

Standard Parts for Model "K", "KU" and "KL" Flywheels

Part No.	NAME	No. per Engine	Price Each
	Flywheel Stud (See Crankshaft Group)		
9327-A	Flywheel Nut	6	\$0.05
91294	Flywheel Nut Lock	3	.05
	$\frac{1}{8}$ "-18-USSx $\frac{5}{8}$ " Hex. Head Cap Screw.....	3	.05
	$\frac{1}{8}$ " Standard Lock Washer	3	.05

Standard (Old Style) Parts for Model "K", "KU" and "KL" Flywheel

Part No.	NAME	No. per Engine	Price Each
941	Flywheel Bolt (Not Illustrated)	6	\$0.30
	$\frac{5}{8}$ " S. A. E. Castle Nut (Not Illustrated)	6	.10
	$\frac{3}{32}$ "x $1\frac{1}{4}$ " Cotter Pin (Not Illustrated).....	6	.05



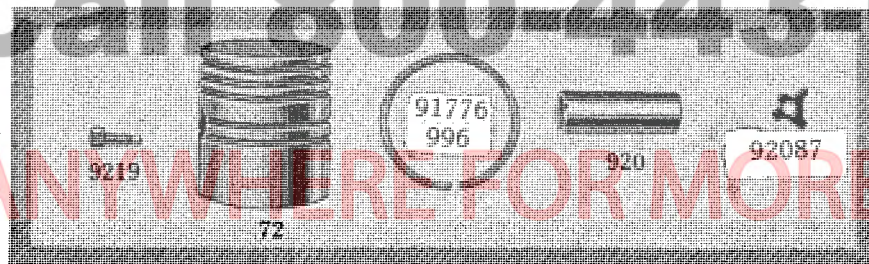
Flywheel Group

Special Parts for Model "KU" Flywheels (For Electric Starter)

Part No.	NAME	No. per Engine	Price Each
9515	Flywheel Ring Gear (138 Teeth).....	1	\$16.00

Special Parts for Model "KL" Flywheels (For Electric Starter)

Part No.	NAME	No. per Engine	Price Each
7240	Flywheel Ring Gear (158 Teeth).....	1	\$8.00



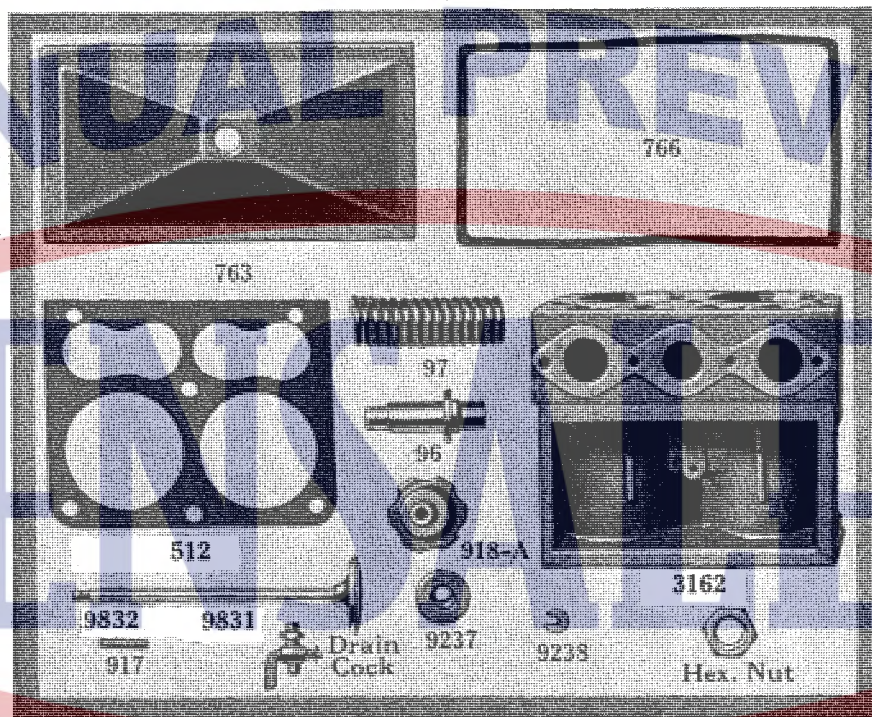
Piston Group

Always Give ENGINE NUMBER AND MODEL When Ordering Parts

Piston Group

Standard Parts for Model "K", "KU" and "KL" Engines

Part No.	NAME	No. per Engine	Price Each	Part No.	NAME	No. per Engine	Price Each
72	Piston	4	\$6.00	91776	Piston Ring, Oil Regulating Type	4	\$ 1.00
920	Piston Pin	4	1.50	9846	Piston, Complete Assembly	1	10.50
9219	Set Screw (Piston Pin).....	4	.25		(Not Illustrated)		
92087	Lock (Piston Pin Set Screw)	4	.05		(Assembly includes the above parts.)		
996	Piston Ring, Comp. Type.....	8	.50		Note—For Oversize Pistons, Etc., See Page 39.		



Cylinder and Valve Group

Standard Parts for Model "K", "KU" and "KL" Engines

Part No.	NAME	No. per Engine	Price Each	Part No.	NAME	No. per Engine	Price Each
3162	Cylinder Pair, Complete with all Studs and Valve Stem Guides	2	\$60.00	918-A	Nut (Valve Spring Cover)	2	\$0.35
	1 1/8" Welch Plug (Plug for Water Jacket) (Not Illustrated)	4	.05	96	Valve Stem Guide	8	1.00
512	Gasket (Cylinder to Crankcase)	2	.30	9832	Intake Valve	4	2.00
	Cylinder Studs (See Crankcase Group)			9831	Exhaust Valve	4	2.50
	5/8"-11-USS Hex. Nut	12	.05	97	Valve Spring	8	.20
	Manifold Studs (See Manifold Group)			9237	Valve Spring Retainer	8	.20
763	Valve Spring Cover	2	.60	9238	Valve Spring Retainer Lock	8	.10
766	Gasket (Valve Spring Cover)	2	.15		1/8" Drain Cock	2	.25
917	Stud (Valve Spring Cover)	2	.15	92258	Valve—1/4" Oversize Head	4	3.50
				92257	Valve—1/8" Oversize Head	4	3.50

Note—For Regrinding Cylinder Blocks See Page 39.



Connecting Rod Group

Always Give ENGINE NUMBER AND MODEL When Ordering Parts