LIST *of* PARTS

FOR

REID

TYPE A GAS ENGINES

Reid

TRADE MARK REGISTERED

1930

THE JOSEPH REID GAS ENGINE CO.
OIL CITY, PENNSYLVANIA

Foreword

In this book will be found a complete List of Parts of Reid Type A Two Cycle Gas Engines, Sistersville, Reverse and Cut-off Rigs. Complete directions for the installing and operating of Reid machinery are also included. Reference to the index on Pages 3 and 4, will assist you in finding the information desired.

THE REID TRADE-MARK

Nearly all Reid parts have on them the Reid trade-mark shown above. It is the mark of genuine Reid parts and is a guarantee to the buyer that the part so marked is of the Reid high standard of workmanship and material. Insist on genuine Reid parts.

Remember - - - GOOD CARE PAYS

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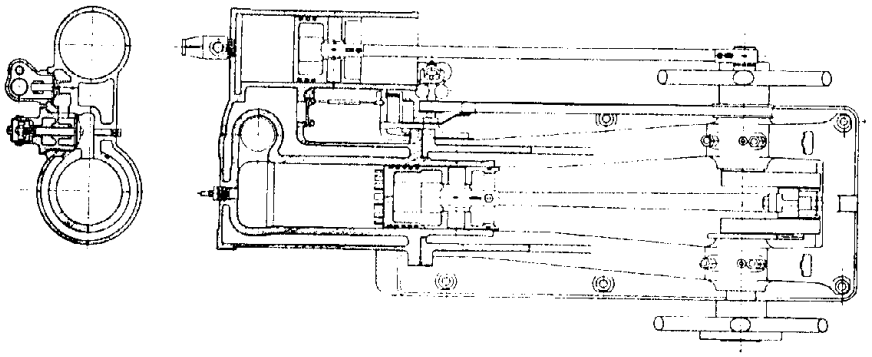
DESCRIPTION OF REID TYPE A TWO CYCLE GAS ENGINES



Sectional View
Diagram No. 1

The Type A Two Cycle Gas Engine has been used successfully in the oil fields for over thirty-four years. This type engine has an auxiliary air cylinder which provides a clean charge of fuel each revolution, thus securing both flexibility and economy for the engine. The main and air cylinders are cast in one piece.

Reference to the Sectional view (Dia. 1) will show the simplicity of their operation. The charging piston, moving forward, draws in through a cylindrical valve a properly proportioned charge of air and gas. A check valve prevents this charge from pressing back on the main stroke. When the charging piston is on its return stroke, the main piston is on its forward stroke, and, near the end of the stroke, uncovers the exhaust ports, releasing the then spent gasses. The pressure in the main cylinder being thus relieved, the pressure of the incoming charge, which has been compressed by the charging piston, opens the main valve and the remainder of the exhaust gas is forced out through the ports before they are covered by the main piston on its return stroke. This action results in securing a clean mixture and perfect combustion. When the charging piston has completed its return stroke and the charge has been delivered to the main cylinder, the pressure holding the main valve open is removed and the spring (shown in the end elevation on the extension of the valve stem) draws the valve to its seat, the smaller plunger on the end of the valve stem preventing the forcible seating of the valve by the compression in the main cylinder. Wearing of the valve face and seat is thus prevented. The action of the valve can be inspected while the engine is running by removing the cap. After the main valve has closed, the return movement of the main piston compresses the charge and forces the combustible mix-

ture into the hot ignition tube thus producing an explosion, or if Wico ignition is used a spark is produced in the cylinder at the proper time. With either system, the engine secures an impulse every revolution.

The cylindrical regulating valves for gas and air in the feed valve case are attached by stems through bushings to lever connected to a regulating adjuster. Motion of the lever opens or closes both the regulating valves, increasing or reducing the size of the openings for gas and air, but not changing their relative proportions. The action of the governor, through the regulating adjuster, is to decrease or increase the quantity of the fresh charge forced into the main cylinder. The engine thus adapts itself to a very light load or to full capacity, giving a light or heavy impulse as needed.

It will be observed that in addition to obtaining an impulse every revolution, securing smooth action, increased power and slower motion, the Type A engine has the advantage of independent valve cases, in which the check valves are operated entirely by a cool, fresh mixture of gases, aided by springs that are not exposed to heat; and the movements of the main valve while in operation can always be inspected.

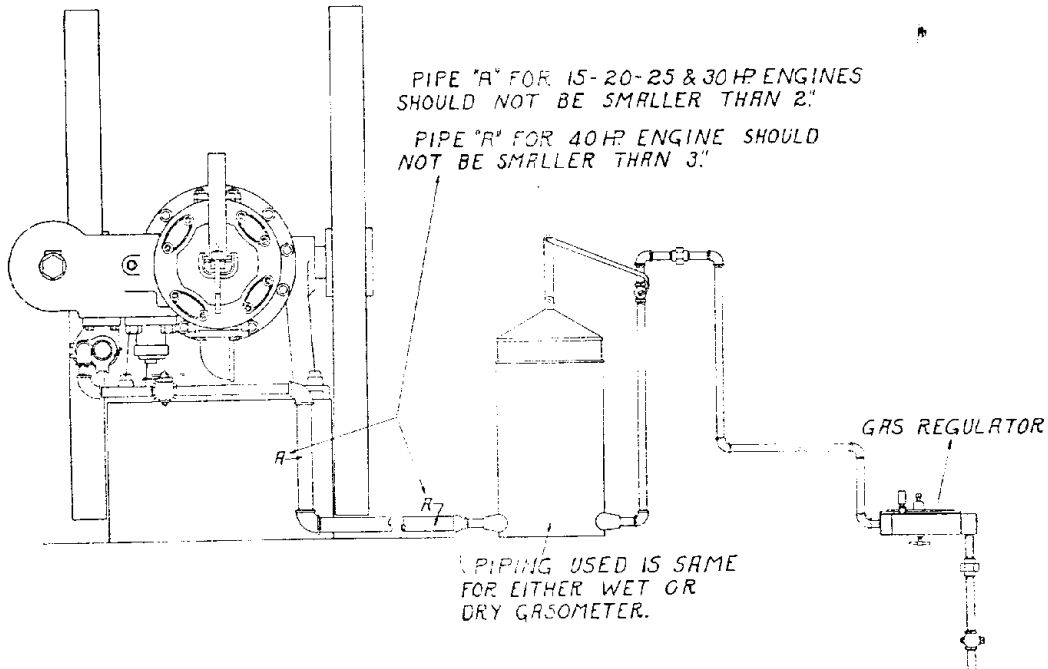


Diagram No. 2

Sketch showing best way of making gas connections on Reid Type A Gas Engines

REID TYPE A TWO CYCLE GAS ENGINES

INSTRUCTIONS

SETTING REID GAS ENGINES

A blue print is furnished giving the necessary foundation dimensions.

Concrete Foundations:

If engine is placed on concrete foundation, a piece of 2" pipe, or small box, about 12 inches long should be placed over each foundation bolt, the top of the box or pipe to be flush with top of concrete. This will allow for any variation there may be between the templet and engine foundation holes.

Leveling Engine:

The bed should be leveled up carefully. This can be done conveniently by placing the crank before the wheels are put on, in the bearings, putting on the caps without the liners and drawing them down enough to keep the crank in place. Use a level on the shaft and drive wedges between engine bed and foundation to bring crank level. Nail strip of board all around top of concrete foundation and pour in a grout made of one-half cement and one-half sand until it comes up about ¼" on bed. The grout should be made liquid enough to run freely. Grout should also be poured in around the foundation bolts to hold them in place. The engine should not be run until after the grout has set firmly.

Timber Foundations:

If timber foundation is used, the top should be made flat so the engine bed will have an even bearing all over. The foundation should be built according to the blue print furnished with each engine.

The outerbearing must be level and in exact alignment with engine bearings. (See page 23 for instructions on aligning outerbearings).

The regulating valves for gas and air and the regulating adjusters are properly set for starting when sent out from the shop.

The gas lines should be of ample size. We suggest that where 2" lines are used in the field they be run full size up to the gasometer. If the gasometer is placed more than ten feet away from the engine or if there are many ells in the line, increase the size of pipe between gasometer and dial cock.

Gas Connections:

In connecting the gas line, put a union between the engine and the dial gas-cock to permit ready removal of feed valve case. The gas-cock is furnished smaller than pipe connections to allow easier regulation. The gas-

ometer is supplied to equalize the pressure of the gas and keep the feed uniform. Set this gasometer outside of the engine house and to prevent freezing, enclose it in a manner that will permit easy inspection and will allow sufficient room for packing in winter. Gas connections for the igniter tube should not be made between the engine and the gasometer.

A satisfactory method of connecting up the gas line is shown in the sketch on Page 7. We recommend that this plan be used wherever possible.

Air Connections:

A length of pipe sufficient to reach outside of the engine house and not smaller than the opening should be connected to the air inlet. This pipe should be removed when starting engine.

As a suggestion, use nipple and tee from air valve, then use another nipple in the upper opening of tee. This nipple should be of such dimensions that a piece of galvanized pipe will easily slip over outside of it. This galvanized pipe should then extend outside the roof. This is done for two reasons, to keep weight of pipe as low as possible and so pipe can be readily removed. Fit other opening of tee with pipe plug.

Exhaust Pipe:

The exhaust pipe should never be smaller than the size of the exhaust elbow. If for any reason it has to be longer than fifteen feet or have more than two elbows, it should be made larger.

Do not cramp the exhaust under any circumstances.

Assembling Wheels:

In assembling the engine, the hub of the wheels should be spread with a wedge furnished for this purpose. On the charging cylinder side of the engine, the hub of the pin wheel should be flush with the end of the crank shaft. The wedge should be driven out and the bolts tightened before the key is driven. The best way to drive the key is to hold a piece of steel on key then drive on this steel with a heavy hammer or sledge. This is done in order not to swell the key causing the wheel to be untrue and avoid the danger of setting up breaking stresses in the wheel. Wipe all parts clean and keep free from grit and dirt.

STARTING REID GAS ENGINES

Tube:

Heat the tube in igniter case to bright cherry red.

Starting Movements:

Set the piston of the charging cylinder at the extreme inner end of its stroke and turn on gas. Turn the wheel backward a half revolution, which will draw a charge into the charging cylinder. Turn the wheel forward to place of beginning which will force the charge into the main cylinder. Turn the wheel back quickly by tramping on plain wheel on clutch side

two-thirds of a revolution, which will produce the compression necessary to cause ignition of a mixture of right proportions of gas and air. Bring the wheel back with a jerk, so it can be let go of before the explosion occurs.

Gas Required:

It is necessary to turn on more gas as soon as an impulse is obtained. If too much gas has been turned on to start, the contents of the cylinder must be forced out by repeating the starting motion with gas turned off. Never get up entirely on the wheel.

Water and Oil:

Turn on sufficient water to keep the engine at the proper temperature. Adjust lubricators to feed properly, and run the engine some time without a load, to determine if any bearings heat. If they do, the cause must be found and the trouble remedied before throwing in the load. If everything has been properly inspected and found in good order, throw in the clutch carefully and steadily.

REGULATING REID GAS ENGINES

Regulating Valve Adjustments:

The adjustment of the regulating valves and governor of each engine when shipped is made for load at normal speed with Oil City gas. If regulations of the gas supply at the gas-cock will not give satisfactory results when the clutch is thrown in, a new adjustment may be required for the load. First try to get regulation desired with the gas-cock. Do not try to run with it wide open.

For additional information see directions for setting governor valves on pages 12 and 13.

Additional Power:

If more power is needed, loosen the thumb-screw on the adjuster and increase the openings of the regulating valves by lengthening the adjuster, trying different adjustments of the gas-cock for each slight change of the adjuster until the impulses are regular at the desired speed with the full load. Then set the tension of the governor springs so that the governor balls will spread if the speed increases.

Curtailing Power:

If less power is required and reducing the supply of gas at the gas-cock makes the action irregular, decrease the openings of the regulating valves by shortening the adjuster a little and try each adjustment carefully with different quantities of gas. Be sure that the igniter tube, if used, is properly heated while adjusting.

Gas Variations:

If the quality of the gas supplied is poor or the pressure too light, it may be desirable to close the air regulating valve a very little, while, if the

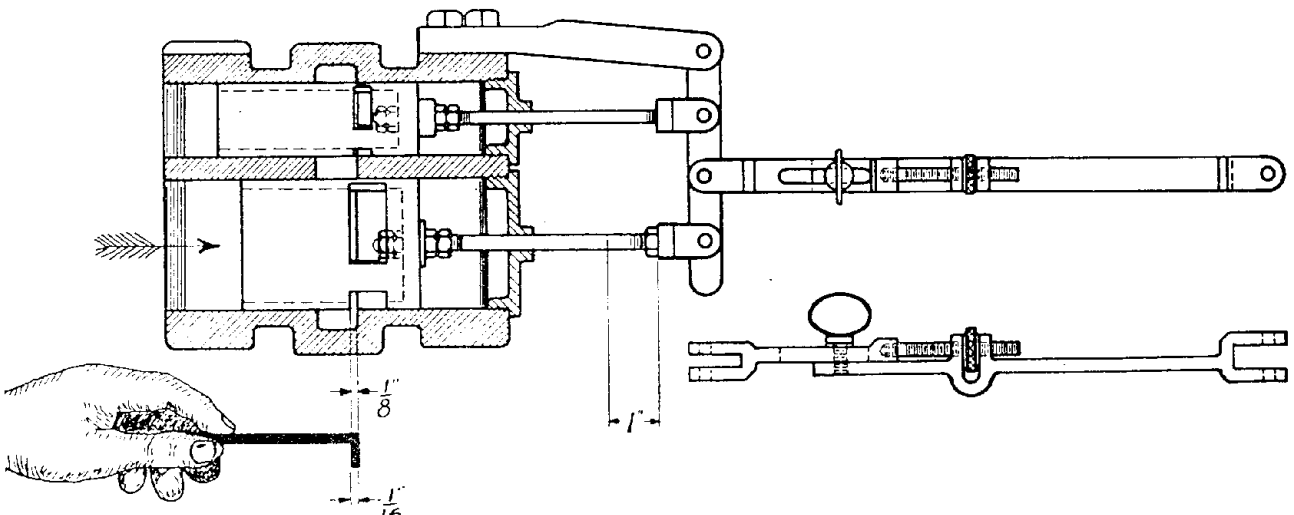


Diagram No. 3. showing method of adjusting valve.

gas is richer than ordinary natural gas, a slightly larger opening for air may be required. The gas regulating valve is set to close slightly in advance of the air regulating valve, and when so adjusted, the proper opening for starting may be secured by turning the adjuster until a hook of wire, flattened to a sixteenth of an inch in thickness, can be inserted in opening of air regulating valve. This is explained fully below.

Governor Adjustments for Speed:

Test the action of the governor by holding the balls slightly open, which should decrease the speed of the engine. If it does not do so, the faulty adjustment must be corrected by shortening the adjuster and adjusting the supply of gas at the gas-cock until proper motion is obtained. By pressing hard against the governor pulley, the governor can be stopped and the capscrew on the end that controls the tension of the governor springs adjusted for proper speed without stopping the engine.

It is best to have a slight excess of air in order to secure clean combustion.

Governor Spring Breakage:

Undue breakage of governor springs and spring clips usually occurs on engines which are on beam wells, operating very slowly for most of the time, but having the air and gas valves set for a higher speed such as required for pulling rods or tubing. With this setting of the air and gas valves, it is necessary to have very low spring tension on the governor balls in order to secure steady running. Being under low tension, the governor balls move violently with the quick fluctuation in speed when the beam goes over the top, and cause spring breakage. The remedy is to close up the turnbuckle on the gas and air valves so the governor balls will not come to a violent stop when the speed fluctuates.

SETTING GOVERNOR VALVES ON REID GAS ENGINES

To set the governor valves on Reid Engines proceed as follows: Examine the stem of the air valve. A small nick will be found in it. This nick should be one inch from the head that screws on the air valve stem and should stand up. If it is not in the proper position it should be so placed, the one inch being measured at the joint between the head and the lock nut. The nick being placed in the proper position, a piece of wire should be secured and a right angle bend made in it one-half inch from the end. This end of the wire should be about 1-16 inch thick. (If the wire is too large it can be flattened down to the correct size). The wire should be long enough to allow its being pushed into the air opening so the point will drop into the port. If an air pipe is used, it must be removed while doing this work. Reference to Diagram No. 3 on Page 11 will aid in making this adjustment.

Loosen the wing screw on the adjuster and by turning the adjusting nut, move the adjuster so the valve will close up until it touches the wire which has been inserted previously in the port. The adjusting nut should then be turned back slightly until the wire can be moved not more than 1-16 of an inch backward and forward. This makes the total opening of the air valve ⅛ inch. Lock the valve in this position by tightening up the wing

screw on the adjuster and start the engine. When the engine is up to speed, the governor balls should lie clear in, close to the stem of the head. If they do not but tend to throw out, stop the governor and tighten the screw which holds the spring clip on the springs. This increases the tension on the governor springs and prevents the governor balls from throwing out before the proper speed is reached. After making this adjustment, the engine should be speeded up and tests made to see that the governor is not adjusted too tightly. The balls should throw out when the proper engine speed is reached. If they do not, the spring has been made too tight and should be loosened until the proper adjustment is made.

When the above adjustments have been made, the engine should operate smoothly with an explosion every revolution. Do not turn on any more gas at the dial cock than is necessary to run the engine up to speed with the load.

If the gas pressure is very light, it may be necessary to open up the gas valve. To do this the distance between the nick on the air valve stem and the head should be slightly reduced. If the gas pressure is higher than ordinarily used, the air valve should be opened slightly. This is accomplished by increasing the distance between the nick on the air valve stem and the head. Increasing this distance opens the air valve and has the effect of closing the gas valve. Very little movement is required in making any of these changes, a half turn of the stem being about the extreme adjustment required.

The amount of opening of the air valve as tested above is for 12 and 15 HP engines. For larger engines the test should be made the same, making the opening slightly over ⅛ inch. In all cases this opening should be kept as small as possible as the proper mixing of gas and air and close working of the governor depend on it being kept down to where it will only allow a proper amount of gas to pass through the opening. The distance of one inch on the air valve stem is kept the same on all sizes of engines except in cases noted above.

A test can be made after the engine is running to determine whether the valves are opened too much. The adjuster can be moved slightly. If it moves so as to close the valve, the engine should slow down immediately. If, when the valve is opened, the engine speeds up or works stronger it shows that more power can be secured by a little more opening. Hence whenever more power is needed, the valve can be opened slightly. It is a good plan to put a file mark on the two movable portions of the adjuster so if any change in the adjustments occurs it can be discovered.

TIMING THE WICO

Timing Wico Igniters:

To adjust the length of the eccentric rod to time the WICO spark:

Place the WICO timing lever at "1" for the R-1 machine and at the "Start" mark on the Type OC magneto. Remove spark plug from cylinder and spark wire from magneto.

In the Type R-1 machine a snap is heard when the spark is made, but the Type OC magneto is practically noiseless. To tell when the spark is made, place a short piece of wire in the terminal plate of the OC magneto, where the spark wire was attached and bend the wire so that the end is about ¼" from the head of one of the screws which holds the terminal plate to the cover. Operate the magneto by forcing the WICO driving bar in by hand to see that the spark is produced between the wire and the screw head. Turn the flywheels until the piston is drawn out of the cylinder as far as it will go. Shorten the eccentric rod as much as possible. Connect the eccentric rod with the WICO driving bar. Turn the flywheels until the crank is at center nearest the cylinder. Lengthen eccentric rod until the WICO snaps (in the case of the Type R), or the spark is seen (in the case of the Type OC). Lock the eccentric rod at this length.

The timing will probably now be correct but, in order to check it up, turn the flywheels slowly until the Type R snaps or the Type OC makes its spark. If this does not occur, lengthen the eccentric rod slightly until it does occur.

Now place the WICO timing lever in the cut-out position and turn the flywheels. If the magneto fires, shorten the eccentric rod just enough so it will not fire.

For further instructions regarding fitting Wicos to engines, see our Wico Magneto Bulletin.

RUNNING REID GAS ENGINES

Lubrication:

Correct lubrication is very essential to satisfactory engine operation. Pure mineral gas engine oil should be used in proper quantity to secure ample lubrication but the use of an excessive amount should be avoided. Animal oils and compound oils should never be used as they carbonize readily and gum the piston rings.

Kind of Oil:

To secure the best results we recommend the following analysis:

OIL SPECIFICATIONS

	Western Paraffine Base Oil	Pennsylvania Paraffine Base Oil	Western Oils Asphalt Base
Gravity	24.5 Baume	25° to 28° Baume	20° Baume
Cold Test			0° Fahr.
Flash	410° to 420° Fahr.	400° to 410° Fahr.	360° to 380° Fahr.
Fire	470° to 480° Fahr.	480° to 490° Fahr.	405° to 425° Fahr.
Viscosity at 100° Fahr.	400 to 410 Seybolt	360 to 370 Seybolt	515 to 570 Seybolt
Viscosity at 210° Fahr.	55 to 60 Seybolt		

Insist upon the right oil. It saves money. If you cannot obtain this oil from your dealer, write us and we will be glad to furnish the proper oil or tell you where it can be secured.

If your engine has a force feed oiler the following information is important:

Force Feed Oilers:

Before starting the engine for the first time and at least once a month thereafter, the following test should be made: Disconnect the feed pipes at the engine and by means of the hand crank, force oil through all the pipes, making certain that none of them are clogged. If oil does not flow through pipe, disconnect it and clean out any dirt which may be in it, examining also the check valve and cleaning it if necessary. Often apparent failure of the force feed oiler has been found to be nothing more than clogged feed lines and failure of oil to reach the bearing surface will result in engine running hot with the possibility of a burned out bearing or scored cylinder.

Amount of Oil Required:

Reference to the table below will give the approximate number of drops of oil per minute to be supplied to the various points, engine running at the rated speeds given below:

Location	Drops of oil supplied per minute at rated speed	
	12-15-20 HP	25-30-31-35-40 HP
Top of cylinder	8	8
Side of Main Cylinder		3
Air Cylinder	5	5
Side of Main Cylinder		3
Side Rod	4	4
Crank Pin	7	7
Piston Pin Wiper		4

The following are rated engine speeds:

Size	Speed
40 HP	150
35 HP	160
31 HP	160
30 HP	160
25 HP	160
20 HP	160
15 HP	165
12 HP	170

It should be understood that conditions under which the engines operate may vary, so a little more or less oil than given in the above table may be required. The above recommendations should be applied with good judgment although in the majority of cases they will be found satisfactory as given.

The feed of each pumping unit is regulated independently, and can be adjusted while the pump is in operation.

To increase the feed place a screw driver in the slot of the feed regulator and turn to the left until the desired amount is being supplied. To decrease the feed turn the feed regulator to the right. A lock spring underneath the cover holds the regulating nut rigidly in place after adjustment.

The regulating nuts are purposely made to turn with a screw driver to prevent outsiders from interfering with the regulation.

Too Much Oil:

If an excessive amount of oil is fed to the charging piston, some of the surplus may get into the feed valve and be carried over by the charge through the main valve ports, gumming and clogging the valve and stem.

Pulley Bearing Lubrication:

The pulley bearings on Reverse Rigs should be lubricated by Light No. 1 Cup Grease. Enough of this grease should be used to squeeze out at end of pulley. Replenish the grease at intervals by means of the pressure gun furnished with the Rig.

Do Not Use Light Oil

Kerosene Oil for Cleaning:

A little kerosene oil or benzine squirted into the air inlet occasionally will soften and remove the deposit, but good judgment in the use of oil will prevent the possibility of any such deposit. Ordinarily the valves need no oil but should the main valve show dry on inspection, the cap should be filled up to the top with oil and screwed into place. The oil will then work up along the plunger.

Main Valve:

The main valve keeps itself clean and in alignment by its own wear and needs no attention, unless an excessive amount of a poor quality of oil is supplied to the charging cylinder, or the gas is dirty.

Copper Gaskets:

The main valve case is packed with copper gaskets (these are copper rings), one at the top which must withstand the full force of the explosion, and one at the bottom against the light pressure of feeding the fresh charge. When properly packed so no leak occurs, these copper rings are very durable. Their condition should be investigated occasionally by removing the fuel valve case, disconnecting the side rod at the wrist pin, and trying the compression. A leak large enough to allow hot gasses to blow through the upper gasket will soon corrode and destroy it. In renewing these gaskets, the seats must be perfectly cleaned and any deposit that has burnt on to the upper seat, entirely removed, as well as any deposit of gummy oil on the sides that might be forced up in raising new gaskets to place.

Replacing:

Insert the new upper gasket (which we furnish cut to exact length) with the ends carefully butted together in place over the ports and push the opposite side of it up as far as it will go by hand and force it to its seat by raising the valve case against it. Put the lower gasket in its groove. A good seat must then be formed on both gaskets by driving the valve case up repeatedly. Tighten up the valve case nuts again after the engine has been run a day. It is extremely important that this packing should be carefully done, as the durability of the gaskets and the good running of the engine depend on it.

Gasket Inspection:

Whenever the case is taken down, the gaskets should be examined and the joints tested by trying the compression before starting the engine. The main valve can usually be cleaned with kerosene oil and the seats ground without taking it apart. Be sure that it works freely without binding at any place. The main valve cap should be used, as it acts as a cushion for the valve.

Piston Rings:

The piston rings and grooves must be cleaned as often as necessary to keep them working freely, depending on the amount of work, speed, quality of oil, amount used, etc.; good mineral oil, used with good judgment and careful attention, will reduce the amount of cleaning necessary. Any deposit formed underneath the rings will prevent their elastic action and cause the piston to drag and wear the cylinder. The deposit can be cleaned off by pouring a little kerosene oil on the rings and working them around in the grooves, scraping the grooves until the carbon is washed away. If necessary to remove the rings, use strips of thin sheet-iron so as to not unduly expand them. If poor oil is used, or the cleaning neglected, the two end rings may become cemented in so tightly by the hardened carbon that they cannot be removed readily, in which case they will wear the cylinder irregularly. With new rings, or rings recently cleaned, there may be so much blowing as to require quick turning to produce compression.

Doping Piston:

Doping the piston with heavy oil will assist in starting. Before replacing the piston, examine the oil holes in the connecting rod head and clean the grooves in the babbitt.

Exhaust Ports:

With good oil, properly used, the exhaust ports remain clean a long time. If any deposit has formed on the edges of the ports, which can be seen when the piston is out, it should be removed.

Dirty Gas:

If the gas used is dirty, the action of the gas and air regulating valves may be interferred with. These valves are easily removed and cleaned.

Cooling Water:

To secure the highest efficiency, the cooling water leaving the jacket should be about 175° F. When possible, keep the engine cooler.

Cleaning Jacket:

A good water supply is needed. Muddy or impure water will deposit enough sediment in the water jacket to interfere with properly cooling the cylinder. This sediment can be cleaned out by removing hand hole plates and scraping out deposit. If scale forms, it can usually be removed by filling jacket with crude oil or benzine over night. It is better, in case of bad water, to have a storage tank and keep the same water in circulation, avoiding the possibility of troubles caused by an imperfectly cooled cylinder. When salt water is used a deposit forms very quickly which can be dissolved readily and washed out with fresh water.

Water Connection:

When water is circulated through the engine without a pump, the return pipe going upward from the engine should be fitted with a tee where the pipe runs over to the tank. The horizontal pipe should go slightly upward to the tank and must enter the tank through the side and below the water level. An air pipe should run up from the tee and extend higher than the top level of the tank.

The tank should be kept full when the pump is not used and for proper circulation the hot water should return below the surface of the water in the tank.

If for any reason it is necessary to run the return water pipe from the engine over the side of the water tank, then a circulating pump must be used.

Bad Water:

In localities where the water is heavily mineralized, we recommend that the tank be completely drained at times when water is available. This will prevent an accumulation of heavily concentrated water with a consequent loss in cooling properties.

A drain pipe should be placed near the bottom of the tank if possible so the hard water will waste away. This construction is shown in Diagram on Page 19. Use of this system however requires a continuous supply of water from a well or other source.

The importance of the water supply is often underestimated and for this reason we think the article by Mr. H. E. Chambers in a recent issue of "Power," reprinted in part, can be read profitably by all owners and operators of Reid Gas Engines.

A GOOD WATER SUPPLY NEEDED

"In the majority of plants water is too costly to be wasted after leaving the engine jackets and independent cooling systems, or rather, recooling systems are necessary. These systems, though simple, must be absolutely reliable. Failure of the water results in the most expensive of all damages, for cylinder heads and cylinders crack quickly, pistons seize, and cylinders score with no warning if circulation stops."

"Equally as important as a dependable supply is that the water does not deposit scale in the engine jackets. Scale accumulation will cause cylinders and cylinder heads to crack and will greatly increase the wear on cylinder bore and piston rings as it retards the flow of heat from the cylinder walls to the jacket water. In some instances, scale deposit can be prevented by circulating enough water through the engine to prevent any large temperature rise in the water. Contrary to a surprisingly widespread belief, scale forming water does not lose its scale-forming properties by being used over and over again. Scale will really be deposited at an increasing rate due to concentration by evaporation. Scale-forming water can be made suitable for oil engine cooling only by treatment with chemicals. Correctly treated water will remain clean and free from moss for an indefinite period. Where

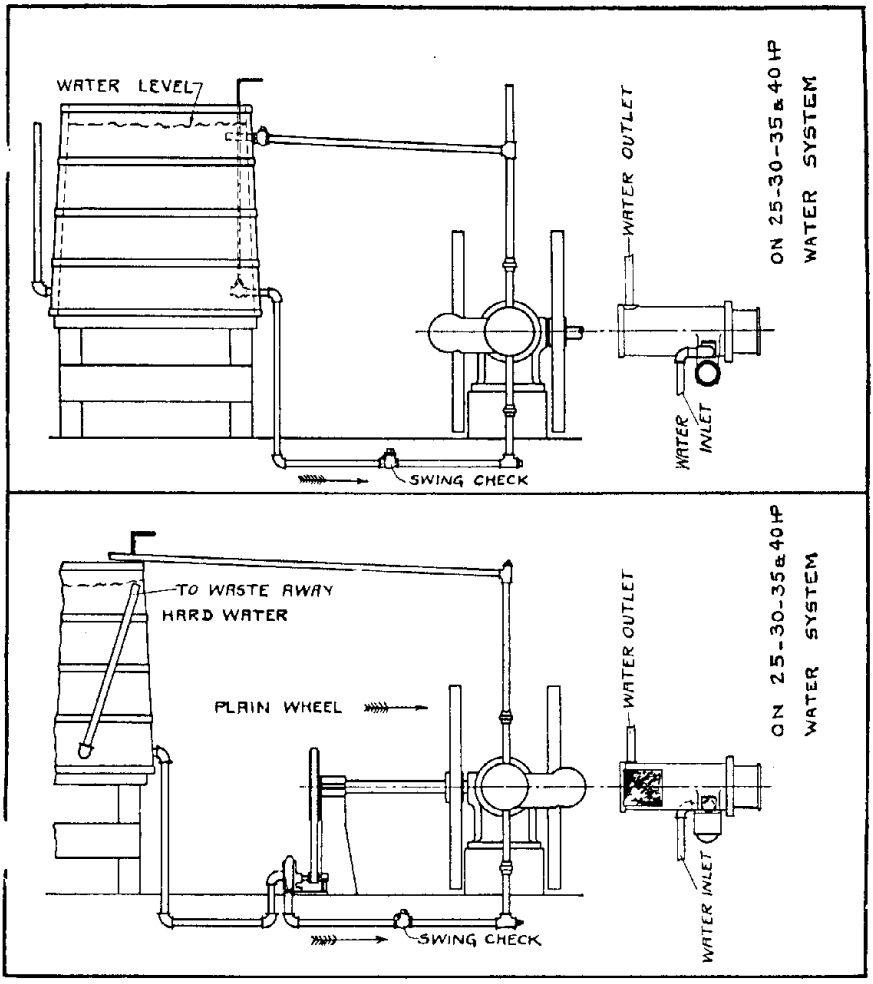

WATER LEVEL
WATER OUTLET
WATER INLET
SWING CHECK
ON 25-30-35 & 40 HP
WATER SYSTEM
TO WASTE AWAY
HARD WATER
PLAIN WHEEL
WATER OUTLET
WATER INLET
SWING CHECK
ON 25-30-35 & 40 HP
WATER SYSTEM

Diagram No. 4

water requires such treatment, the cooling system should be filled with treated water, not raw water. All makeup water should be treated before it is added to the system. The correct selection and proportion of chemical is of greatest importance."

"If scale has already formed on the jackets, the proper chemical can be secured by sending a specimen of the scale to a chemist for analysis. A muriatic acid solution has been widely used for this same purpose although less expensive chemicals can be used. In case the available cooling water is salty to any extent, scrap zinc in the water jackets and piping system will prevent electrolytic action."

"In figuring cooling water, assume from eight to twelve gallons of water per horsepower hour for a two stroke cycle engine with a temperature range of 50 degrees and approximately ten gallons per day per horsepower for evaporation."

"In handling the jacket water all operators should be cautioned against following their natural inclination to give more water as the load comes on. The circulation should actually be reduced slightly to permit the cylinders to warm up and expand with the rapidly heating pistons and then be gradually increased. Increasing jacket circulation as the load comes on is likely to cause a seized piston. Never turn cold water into a hot engine or vary the temperature of the water suddenly as damage may result. The circulation should be continued for ten or fifteen minutes after the engine is shut down in order to carry off the stored up heat from the interior."

Care of Igniter Case:

Keep air holes in the igniter case free from the particles of asbestos that flake off the lining. Keep the tube at as low a temperature as will give good ignition. If gas is not properly burned in igniter case, the tube may be insufficiently heated or heated too high.

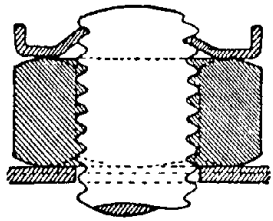
Care of the Gasometer:

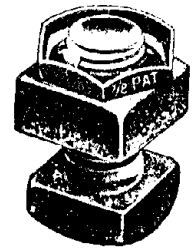
The gasometer should be examined regularly and the cock kept well oiled. If the dry gasometer is used, always run a small pipe from the hole in top of the gasometer to the outside of the building. If the wet gasometer is used, see that the fluid is kept up to within 1" of the top. If oil is used, see that it is replaced as often as it gets thick from the churning.

Throwing Oil:

If oil gets on fly wheels, throwing oil on floor, and power house walls, a piece of rubber belt, fastened so it will brush face of wheel, will aid in eliminating this trouble.

HOW TO APPLY "PALNUTS"



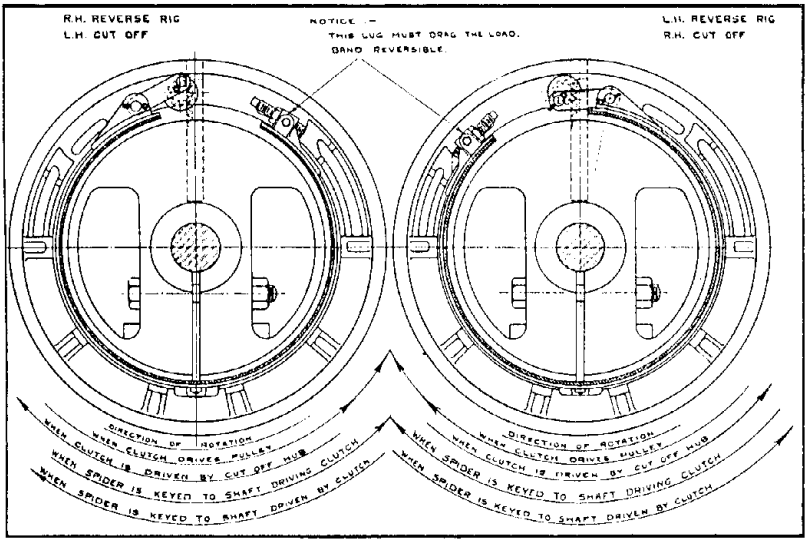


Palnuts are used in several places on Reid engines and rigs. The directions below should be followed in applying these nuts.

Spin the "Palnut" smooth face first onto the bolt until it touches the nut (the six turned-up sides pointing away from the nut as shown in the illustrations.) Then tighten the "Palnut" with a wrench one-quarter to one-half of a turn more to lock it.

INSTRUCTIONS FOR ASSEMBLING BAND CLUTCHES

To secure proper performance from band clutches it is important that the band be installed so the lug draws the load. Reference to the drawing below shows the proper position of the lug with respect to the direction of load.



ROD HEADS

Side Clearance:

As the rod head or wrist pin bearing is sent from the shop, the cap is fitted with very little play, but the body is allowed 1-32" to 1-16" side play according to size of the crank. The reason for this is that the babbitt is apt to spread in time from force of explosion, and aside from lack of oil, a tight fit will heat a bearing quicker than any other cause. This should be kept in mind in rebabbitting a wrist pin bearing and a liberal side clearance allowed. When cap and body are bolted together in the wrist, enough paper liners should be between the joint, so when the crank pin is on top center, while the fly wheels are moved slightly to and fro, a movement can be detected when the finger is placed on the joint of the crank and the bearing.

When engine has been in operation about a week, take off rod head and relieve sides of the body or side next to rod.

On engines which have the crank pin oiled by means of a wiper, it is advisable at intervals to take off the wrist bearings and see that the oil holes are clean and babbitt has not closed up the holes or grooves. The bearing may heat enough to make the babbitt soft, and then fill up the oil holes in such a way as to give the impression they never have been drilled.

On new engines fitted with centrifugal type ring oilers, attention should be given to see that the oil pipe is dropping the oil properly in the ring oiler groove.

PISTON BRASSES

There is a side play of 1-16" on all connecting rod brasses in main piston head. These should not be keyed too tightly. When engine is stopped, the operator should be able to shake the rod sideways freely on pin.

As the two-cycle engine always has a pressure against the piston and does not draw in its charge with the main piston, the key does not need to be kept tight. Keying up the rod too tightly results in considerable loss of power and greatly increases the danger of bending the rod, also causing damage to cylinder walls.

The side or charging connecting rod, should be kept about as tight as a steam engine connecting rod, or, while the rod can be moved sideways easily, it must not have the end play allowed on the main rod brasses.

CAUSE OF BROKEN PULLEY SPOKES

Sticky belt dressing, by causing too great an adhesion to the pulley surface of the pulley may cause the pulley spokes to break off. Gas engine pulleys, unlike a steam engine, which comes to a slow stop before reversing, are often reversed at full speed and, unless there is a slight slip of the belt on the pulley or unless the clutch slips, it sets up an enormous strain on the spokes causing them to break.

A belt which slips continuously will cause a heated pulley rim. This has been known to cause breakage due to the rim expanding away from the spokes.

BACKFIRING

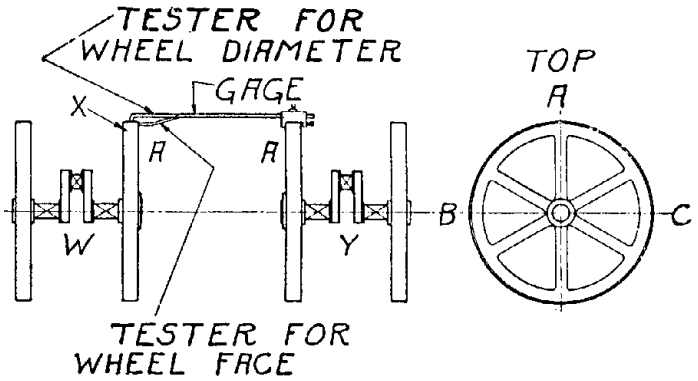
An engine should not back-fire continuously. An occasional back-fire may be caused by the governor, operating the air and gas valves, making a change of mixture, but when back-firing occurs often, it can be remedied by proper fuel adjustment, or seeing that the tube (if hot tube is used) is properly heated. A cold tube, that is, a dull red tube or a tube heated high up (an igniter case without a liner) can cause slow combustion and back-firing. When care is not used in handling a reverse engine from the derrick, back-firing can cause much damage in broken flyhweels. Often these engines are run at a speed beyond that which they should be and if the pulley is suddenly reversed at full speed and a movement of the telegraph lines causes a change of speed, it will create a condition that may cause a broken flywheel.

RELIEF VALVE

In all cases, the relief valve for the air cylinder should be used. A pipe should lead from this valve to the outside of building.

DIRECTIONS FOR LINING UP TWIN ENGINES

The engines should be lined up after the shaft, clutches, and pulley are put in place but before the cut-off hubs are bolted to the flywheels.



To secure correct alignment of the engines, proceed as follows: First level up one engine, lettered Y in the sketch, so it is set correctly. The cut-off wheel X of the other engine should next be marked with chalk at the top, point A on the sketch. Clamp the test bar on the cut-off wheel of the engine which was leveled up placing it so the point of the test bar is touching the rim of wheel X at point A. Adjust the bar so the point is just touching the rim. Now turn both wheels back one quarter turn to position B. If

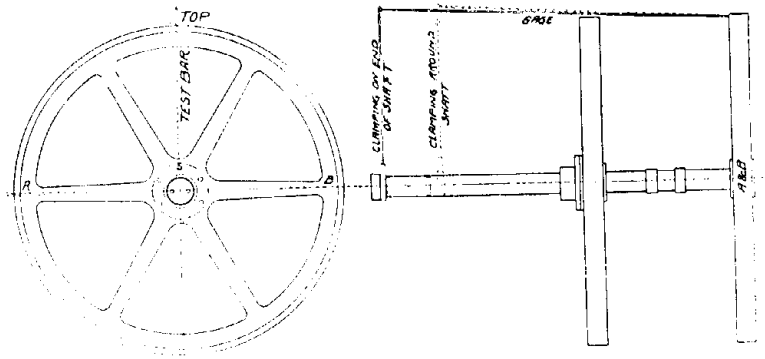
the engines are properly aligned, the pointer will just touch the wheel rim as before. If it does not do this it will be necessary to raise or lower the engine W until the point does just touch the wheel rim as before. Having secured the proper setting at position B, turn both wheels ahead to position C and try the alignment as at B. If this alignment is not correct raise or lower the engine W until it is so. When the engines are correctly aligned, the pointer on the gage should touch the rim the same at positions A, B, and C.

Having lined up the wheel rims, remove the tester from the wheel rim and replace it with the tester for the wheel face. With both wheels at position A, adjust the pointer on the gage so it just touches the face of the cut-off wheel X of engine W. Turn both wheels back one quarter turn to position B. If the engines are correctly aligned, the pointer will just touch the wheel face as before. If it does not do this, it will be necessary to move engine W horizontally until the point does just touch the wheel face as before. In making this adjustment be careful not to disturb the vertical alignment of the engines. Having secured the proper setting at position B, turn both wheels ahead to position C and try the alignment as at B. If the alignment is not correct, move the engine W until it is so. When the engines are correctly aligned, the pointer on the gage should touch the wheel face the same at positions A, B, and C.

Having secured the proper alignment of the engines by using the two above methods, the cut-off hubs can be bolted to the flywheels. If outerbearings are used, be careful not to draw the engines out of line when adjusting the outerbearings.

DIRECTIONS FOR TESTING THE ALIGNMENT OF OUTERBEARINGS

Clamp the test bar in a level position between the end of shaft and shaft cap; then insert one end of the gage into the hole in the test bar that will best permit it to be used at a right angle (square) with the bar (the



test bar has several holes in it for that purpose) and set the gage so that it will just touch the farther wheel as at A; then turn the wheel half a revolution and test wheels again with the gage at B. If the gage touches the wheel alike in the two positions, it proves the outerbearing to be in line

in a horizontal direction. If there is any variation in distance between the test bar and wheel in the A and B positions, the outerbearing must be adjusted until the two positions gage the same. After the outerbearing has been adjusted for the A and B positions, turn the wheels a quarter of a revolution bringing the test bar in an upright position and test, with gage between test bar and TOP of wheel; if this is found to be the same as for other positions the outerbearing is in proper alignment; if not the outerbearing must be raised or lowered as may be required to bring the distance at top the same as at A and B. When the outerbearing is in proper alignment the distances in positions A, B and Top will be the same.

Instructions for Adjusting Reverse Brake Band:

Loosen adjusting nut until it is almost unscrewed from adjusting screw, throw reverse lever on derrick floor into reverse position. See that the eccentric or cam on reverse base is at the end of the slot, tighten the adjusting nut until the clutch runs in reverse. It is necessary at various intervals to tighten the adjusting nut from one-half to one full turn to take care of the wear on the band.

CAUSES OF BROKEN CRANKSHAFTS

Taken from "Power"

"Crankshaft failures in gas engines are more common occurrences than is generally supposed. There is often a great deal of contention on the part of the owner that there was a flaw in the material, and in many cases the claim appears to be well founded when superficial appearances only are considered.

"In about 70 per cent. of such cases the break shows that at least a portion of the shaft's diameter had been parted for some time. In other words there are indications of an old break of from one-half to two-thirds the diameter of the shaft, the remainder showing a fresh break. The old break often has the appearance of never having been united. With this condition of affairs the owner is apparently justified in claiming that the shaft was defective and he should receive every consideration that justice and fairness demands, but the real condition that leads to and causes the break should not be lost sight of. In a large majority of cases, broken shafts are the result of loose or misaligned journal boxes.

Crank Shaft Bearings Often Neglected:

"It is not an uncommon thing to see an engine in operation with the crankshaft jumping in one or both journal boxes at each impulse of the piston. It may have been noticed by the operator but lightly regarded, as in his opinion it is only a trival matter and oftentimes the condition of the boxes entirely escapes his notice. It is easy to see how loose boxes may result in broken shafts, for in the first place consider the heavy flywheels that are necessary on a moderate-speed engine of the single-cylinder type, to get steady speed and the best results. If properly carried by the shaft, they really tend to prolong its life rather than otherwise."

"Broken crankshafts would be comparatively rare if the journal boxes were more carefully looked after and kept properly adjusted. The purpose of boxes is to carry the revolving shaft and keep it in perfect line, but this cannot be accomplished on a gas engine unless it is carefully and snugly adjusted all the time. The sudden force applied to the piston, and through it and the connecting-rod to the crankshaft, tends to lift the shaft out of its journal box at each impulse when the engine is turning over – even with the weight of the heavy flywheels holding it down. If the boxes are snugly fitted this lifting motion cannot occur; on the other hand, if the box caps are loose, each impulse raises the shaft and wheels, and as soon as the force of the impulse subsides the weight brings it down again with a thump."

"If only one box is loose and the other is properly adjusted, the loose end of the shaft only will jump, throwing it out of line at each impulse. This condition is even worse than when both boxes are loose, and with the pull of the belt and the weight of the belt pulley added, the cause of a great many breaks can easily be explained.

Effect of Loose Bearings is Cumulative:

"As intimated, a shaft seldom breaks all at once. The conditions that cause the break have been in existence and started the trouble a long time before the final complete rupture comes. The unintentional and undue strain on the shaft every time it jumps in the boxes and this continual heavy strain at regular intervals soon cause a crystallized condition in that part of the shaft where the greatest strain occurs. This crystallization usually begins at a point on the outer circumference of the shaft and travels toward the center. It does not necessarily –and in fact seldom does—affect the entire circumference. At this fragile point, then, a crack is started and as the crystallization grows the crack grows deeper until finally the good metal remaining, no longer able to withstand the strain, breaks. When the broken ends are examined, the fresh break shows only as far as the good metal held on. The original crack may have been started months before and the constant motion caused the broken parts to rub together until they appear as if they had never been united. Many times the owner of the machine uses the expression, "That was never welded properly," or 'The shaft was only partly welded.' The common opinion or supposition that crank shafts are welded together is ill-founded. Cranks are generally drop-forgings or steel castings or are made by cutting them out of solid steel billets. No welding process whatever enters into their formation."

"In one case three shafts in one 25 HP engine broke within one year, all at practically the same point. The conclusion was that some unusual condition about this engine was to blame, and upon investigation it was found that a special length was required in the shaft for the purpose of accommodating an extry-heavy and wide belt. An extension shaft was coupled to the end of the regular shaft and an outerbearing supplied. The outerbearing was found to be out of line with the engine, and in order to run with cool boxes the operator concluded he must have very loose bearings, with the result already stated."

A Safety-First Move:

"A jumping shaft always evokes in the writer an immediate desire to get out of the engine room and as far away from it as possible, yet how many

will tell you that they have operated engines with loose boxes for a long time. Others are as particular to have the journal boxes of their engines properly adjusted as they are to have a good igniting spark."

"Another frequent cause of crankshaft failures is ignition which results in pounding in the cylinder. Ignition in these cases comes before the piston has completed its compression stroke, and the force resulting from the explosion tends to reverse the piston instantly, but the momentum of the flywheel is sufficient to overcome this force. The result of this clash of forces is an extra strain on the crankshaft, which, if allowed to continue for any length of time, can only result in serious damage to the crankshaft and other parts of the engine."

"The crankshaft is an extraordinarily vital as well as a costly part of the engine, and it is therefore important that every owner and operator should see to it that anything tending to affect it adversely and that is detrimental to smooth running should be promptly remedied. It is especially necessary to give a reasonable amount of attention to wrist, crank, and journal boxes to see that they are in snug adjustment and properly lubricated."

The following article was contributed by Mr. Colin K. Lee, of Bowling Green, Mo., to a recent issue of "Power." It should appeal to every owner and operator of a gas engine.

Change of Lubricating Oil Causes Trouble in Semi-Diesel Engine:

Often the trouble an engineer gets into with new machinery is traceable to failure to follow the builder's suggestions. This is especially true as to the lubricating of oil engines.

Some time ago two 25-hp. semi-Diesel engines of the two-stroke-cycle type were installed in a small light plant. For about two months the engines ran well. The erector had purposely left the feeds of the lubricator set above normal, saying that this could be reduced when the engines limbered up. The builders had recommended a very limited list of high-grade and rather expensive lubricating oils. However another engine of the same make had been running some four years on a much cheaper grade and we changed over to this oil without trouble. An oil salesman persuaded us to try a still cheaper oil which he said was just as good. At about the time we made this change in oil, we also cut down the lubricator feeds to those specified by the instruction book.

One evening one engine showed signs of heavy load; it pounded, smoked heavily, and finally, with a few terrific explosions, stopped. The starting torch was going in a few minutes and the engine started without trouble. No reason was found. But the trouble recurred, always at the same time. The second engine followed suit. Both grew worse. The black smoke indicated the engines were not getting enough air. We removed the air intake valve, a large leather-flap affair, and found several flaps stuck down with a sort of gum. We removed this and the engine ran well for a number of hours after which the trouble was repeated, the flaps again being found stuck down. The builders' sales agency, 350 miles away, could not offer any suggestion, except that we might send in the gum

for examination. The trouble continued, punctually each evening, although the engines did not overheat and the lubricators were working, the engine pistons began to stick.

Finally both engines stuck fast. We called another erector. He told us the engines were ruined, having seized both pistons owing to bad oil. A one-ton triplex Yale block was used to break the pistons loose in the cylinders. Both pistons and cylinders were found deeply scored. The engines ran well enough when cold and under light load, but the arrival of the peak about the same time each evening caused enough expansion in the piston to seize.

The surface of the pistons appeared to have been caschardened, and the files used to dress down the scores wore rapidly. The worst scoring was on the bottom of the pistons, indicating that the oil fed into the top of the cylinder was destroyed by heat before reaching the bottom. After dressing the cylinder walls with a rounded abrasive block, the erector warned us to get new cylinders and pistons at once, since he said the old ones were as good as gone. However, after changing back to the oil originally recommended by the engine builders, the engines ran well. We ordered a spare cylinder and piston, but the engines ran so well with the old cylinders and pistons that the new ones were sent back. The operation of the old pistons seemed to indicate that extremely close clearances and fine ground finish are unnecessary.

The cause of the trouble was insufficient lubrication at a critical point, and no doubt the lubricating oil company should be criticized for having salesmen who recommend oils without sufficient knowledge of plant conditions.

Colin K. Lee.

Bowling Green, Mo.

INFORMATION ON BELTS, PULLEY SIZES AND SPEEDS

To find the circumference of a pulley:

Multiply the diameter by 3.1416.

To find the diameter of one pulley when its speed and the diameter and speed of the other pulley are known:

Multiply the diameter of the known pulley, in inches, by its speed in revolutions per minute and divide the product by the speed of the pulley required. The result is the diameter of the pulley in inches.

To find the speed of one pulley when its diameter and the speed and diameter of the other pulley are known.

Multiply the diameter of the known pulley, in inches, by its speed in revolutions per minute and divide the product by the diameter of the other other pulley in inches. The result is the speed of the pulley in revolutions per minute.

To find the speed of a belt:

Multiply the diameter in inches of either pulley by 3.1416, divide the result by 12 and multiply by the speed of that pulley in revolutions per minute. The result will be the belt speed in feet per minute.

To find the length of a belt:

Add the diameters in inches of both pulleys; divide the result by two and multpily by 3.1416. Then divide by 12 and add twice the distance in feet between the centers of the shafts. The result is the length of the belt in feet.

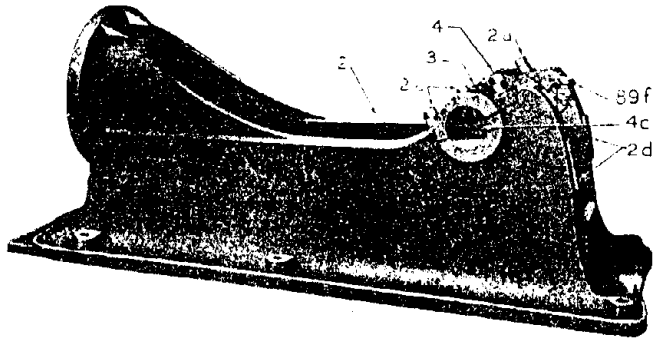
Reid engineers and fieldmen will be glad to co-operate with any owners in the installation and planning of Reid Oil Field machinery. Write or phone our nearest branch.

KEY TO SYMBOL NUMBERS

A number of parts of Reid Engines fit more than one size engine. To assist owners and operators in determining what parts are common to various sizes of engines, we have placed after each part number a symbol number, in parentheses. This symbol number shows on what horsepower engines each size part fits. The horsepowers in each group show that one size part fits all the engines of those horsepowers.

Symbol Number	Engines on which parts are the same.
1	40-35-31-30-25-20-15-12
2	40-35-31-30-25 20-15-12
3	40-35 31-30-25 20-15-12
4	40 35 31 30 25 20 15 12
5	40 35 31-30-25 20 15 12
6	Size used depends on type of clutch and rig used.
7	40-35 31-30-25 20-15 12
8	40-35-31-30-25
9	40-35 31 30 25 20 15 12
10	40-35 31-30-25 20 15 12
11	40-35 31-30-25 20 15-12
12	40-35 31-30-25-20 15 12
13	40 35 31-30-25 20-15 12
14	40 31-30-25 20 15-12 Not used on 35 HP.
15	40-35 31-30-25-20-15-12
16	40-35 31-30-25
17	40 35 31-30-25 20 15
18	40-35 31-30-25-20 15-12
19	40-31-30-25-20-15-12 35
20	40 35 31 30-25 20 15 12
X	Furnished as extra equipment only.
21	31-30-25-20-15-12
22	35-31-30-25
23	Parts common to Rigs No. 1, 2, 4, 4c, 5, 7 and 8.
24	Parts common to the 20", 24" and 36" Band Clutches.
25	Parts common to 20" and 24" Band Clutches.
26	40-35-20 31-30-25 15-12
27	40 35 31 30 25 20-15

BED PLATES AND PARTS



*2 Bed fitted with Caps and Studs (20).
*2a Bed Cap Studs with Nuts (9).
2b Splash Guards (1).
2bb Long Splashers (3).
2bd Oil Splasher Bracket (1).
2ca Oil Catcher (40 HP. only).
*2d Bed Handhole Plate (1).
2da Spring for Handhole Plate (1).
2e Winged Nuts for same (obsolete) (1).
2f Studs for same (obsolete) (1).
2g Dust Cover for Bed (4).
*3 Bed Cap Right Hand, looking from cylinder toward crank (5).
3a Wooden Liners (5).
*4 Bed Cap Left Hand, looking from cylinder toward crank (5).
*4c Chains for Bed (3).
4d Connecting Link for Chain (1).
16 Timber Foundation Bolt for Bed Plate (7).
16a Timber Foundation Bolt for Outerbearing (1).
16b Nuts for 16a (1).
17 Concrete Foundation Bolt for Bed Plate (1).
17a Concrete Foundation Bolt for Outerbearing (1).
17b Concrete Foundation Bolt for Reverse Base No. 249 (1).
17c Concrete Foundation Bolt for Reverse Outerbearing (1).
Templet (Always state for Sistersville or Reverse Engines). (4).

For key to symbol numbers (0) after each part, see Page 30.

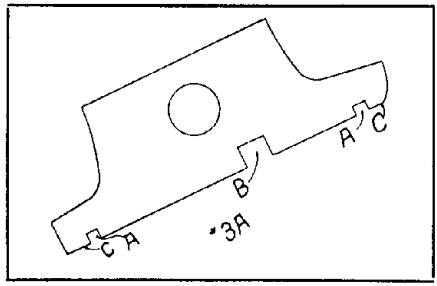
*Illustrated.

See Index Page 3.

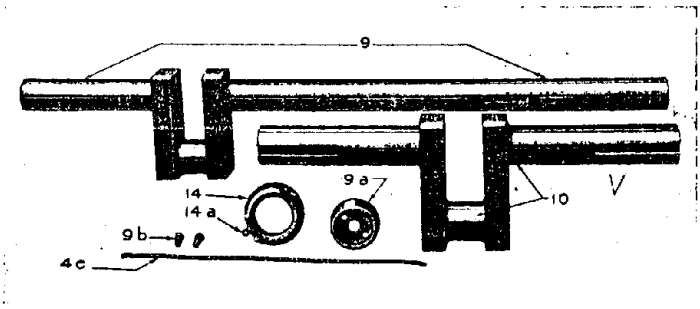
WOODEN LINERS FOR BED CAPS

Directions for Installing

Shallow notches "AA" should coincide with grooves cast in babbitt of bearings. Notch "B" should match slot for oiler chain. Edge of liner outside of slots "AA", marked "CC" on sketch, must touch shaft.



CRANKS



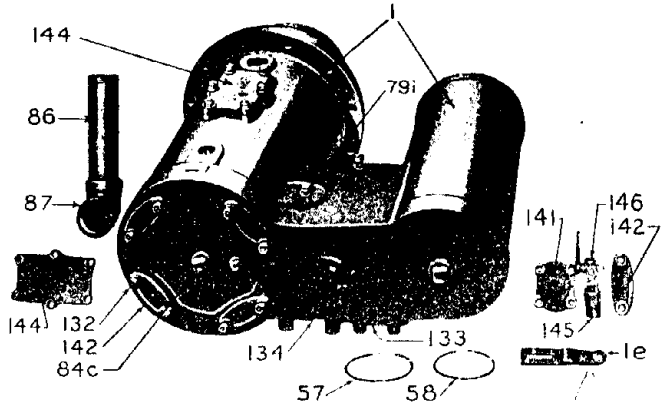
* 9	Long or Regular Crank (5).	410	Counterbalanced Crank Complete (5)
* 9a	Cap for End of Crank (6).	410a	Counterbalanced Crank only (5).
* 9b	Cap Screw for No. 9a (1).	410b	Counterbalance (5).
9c	Centrifugal Oil Retaining Ring (5).	410c	U-Bolt and Nuts (9).
*10	Short Crank (5).	410d	Center Pin (1).
*14	Set Collar (6).	414	Split Set Collar.
*14a	Screw for Set Collar (1).		

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

CYLINDER PARTS

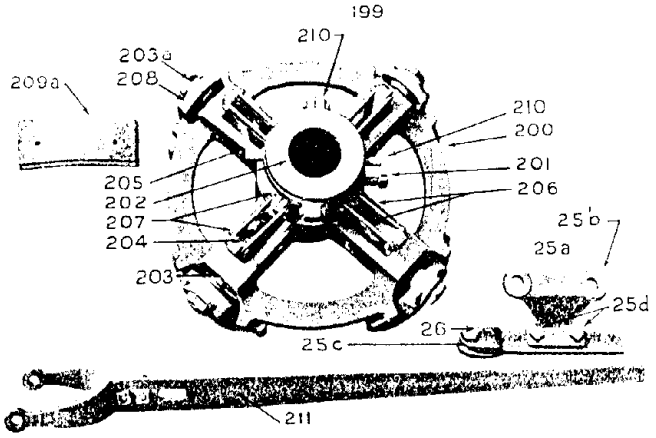


1 Cylinder only (New) (4).
1a Cylinder fitted with Pistons, Pins and Rings (4).
1b Rebore Cylinder fitted with Pistons, Pins and Rings (4).
1e Oil Cup Bracket for Piston Pin Wiper, (8).
1f 3/8" Male Hose Cock
1g 3/8" x 2" Bushing.
15 Cylinder Support, 30, 40 HP only (obsolete).
57 Upper Copper Gaskets (3).
58 Lower Copper Gaskets (3).
85 Flanged Exhaust Ell (3).
86 Exhaust Nipple (10).
87 Exhaust Ell for Pipe Connection (3). Exhaust Pipe.
132 Hand Plate Stud and Nut (1).
133 Fuel Valve Stud and Nut (3).
134 Main Valve Stud and Nut (3).
135 Cylinder Flange Stud and Nut for 40 and 35 HP only (1 1/8"x4 1/2").
6 Cylinder Flange Bolt (1).
6a Cylinder Flange Stud, 25, 30 HP (1"x6").
37 Cylinder Flange Tap Bolt except 40 HP
138 Cap Screw for Exhaust Ell (1).
139 Cylinder Tie, 40 HP only.
139a Cylinder Tie Bolt, 40 HP only.
G141 Hand Hole Plate (square) (8).
L141 Handhole Plate (21).
141a Hand Hole Plate Gasket (square) (8).
142 Hand Hole Plate (oval) (19).
142a Hand Hole Plate Gasket (oval) (19).
142g Hand Hole Plate for Water Inlet, 40 HP only.
142x Hand Hole Plate with Wico Cable Support (19).
143 Pipe Flange for side of Cylinder (8).
143a Gasket for 143.
*144 Hand Hole Plate (oblong) for top of Cylinder (19).
144a Hand Hole Plate Gasket (oblong) (19).
144b Hand Hole Plate, (oblong) with boss, (obsolete).
144c Hand Hole Plate, (oblong) for back end of Cylinder, 40 HP, only.
*145 Relief Cock Bushing (2).
145a Relief Cock Bushing 1 1/4" for end (1).
*146 Relief Cock for above (1).
146a 3/8"x16" Nipple (1).
163 Hand Hole Plate (22).
165 Water Inlet Flanged Ell 45° (1).
166 Water Inlet Flanged Ell 45°-30° (1).
167 Oval Hand Hole Plate, large 35 HP.
167x Hand Hole Plate with Wico Cable Support 35 HP, only.
167a Gasket for 167.
168 Rectangular Hand Hole Plate, 35 HP.
168a Gasket for 168.
168b Hand Hole Plate for Water Connection on 35 and 40 HP Cylinder.
169 Rectangular Hand Hole Plate for Water Inlet in Water Jacketed Exhaust (8).
180 Water Connection for Exhaust, complete (1).

For key to symbol numbers (0) after each part, see Page 30.

See Index Page 3.

SHOE CLUTCH—REGULAR OR SISTERSVILLE TYPE



198 Clutch Pulley only. See Note 1 (6).
*199 Clutch complete less Pulley. See Note 1 (6).
*200 Clutch Spider. See Note 1 (6).
200a Clutch Spider Key. See Note 1 (6).
*201 Clutch Spider Set Screw. See Note 1 (6).
*202 Clutch Sleeve. See Note 1 (6).
*203 Clutch Adjusting Screw (Always state size of thread and length of screws) (6).
*203a Clutch Adjusting Screw Nut (Always state size of thread) (6).
*204 Clutch Arm (6).
*205 Pin for Clutch Arm (6).
*206 Clutch Link (6).
*207 Pin for Clutch Link. (6).
*208 Clutch Shoe (Always state size of thread) (6).
208a Clutch Shoe with Wood Block(Always state size of thread of Shoe) (6).
208b Clutch Shoe with Asbestos Block. (Always state size of thread) (6).
209 Clutch Shoe Block (Always state size of thread of Shoe) (6).
*209a Asbestos Clutch Shoe Blocks (6).
*210 Clutch yoke (6)
*211 Clutch Lever (6).
211a Bolt for Clutch Lever, drilled (6).
211b Bolt for Clutch Lever, not drilled (6).

*25a Two Piece Clutch Bracket (6).
*25b Base for Two Piece Bracket (6).
25bb Base for Two Piece Bracket, for Ring Type Bearing used on 40 HP only(6)
*25c Arm of Two Piece Bracket (6).
25cc Arm for Two Piece Bracket for Ring Type Bearing, used on 15, 20, 25, 31 and 35 HP. (6).
*25d Bolt for Connecting Arm and Base (6)
*26 Fulcrum Bolt for Clutch Bracket (6).

Orders for clutch parts should state diameter of friction rim (do not confuse this with diameter of pulley.) In ordering pulleys, always give diameter and face of pulley, diameter of friction and diameter of bore. If clutch parts are wanted for reverse clutches, it should be so stated and the rig number given. See list of rig numbers on Page 37.

*Illustrated.

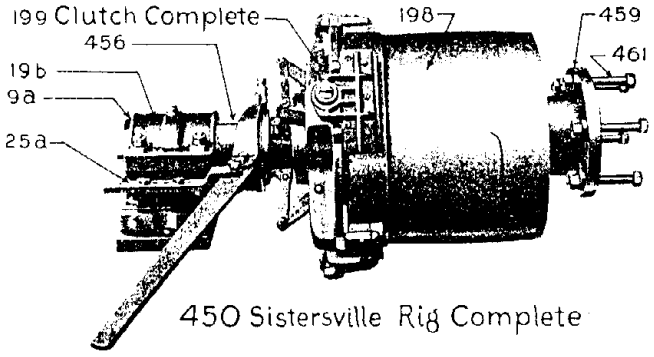
For key to symbol numbers (0) after each part, see Page 30.

See Index Page 3.

NOTE 1

Wide Face Pulleys are now furnished on all Type A engines as shown below:
25, 30 and 31 HP. Sistersville Type—18" face Pulley.
40 HP. Sistersville Type—20" face Pulley.
12, 15 and 20 HP. Sistersville Types are not changed.
The above change requires changes in the following parts:—shaft, spider, pulley, key and sleeve.
Shafts will be numbered as follows:
E458—25, 30 or 31 HP. Sistersville Type Engines.
C458—40 HP. Sistersville Type Engines.
Clutch Spiders will be numbered as follows:
200-6 for 25, 30 or 31 HP. Sistersville Type Engine.
C200-7 for 40 HP. Sistersville Type Engine.
On all repair orders, whether for complete attachment or for separate parts, please use these part numbers and show diameter of pulley, width face, and friction.

REID SISTERSVILLE CLUTCH



SISTERSVILLE CLUTCH OUTFITS

Horse Power. Type A	40	31-30-25	20	15	12
Size Shaft	5"	4¼"	3¾"	3½"	3¼"
Style Clutch Used	24"	20"	16"	16"	16"

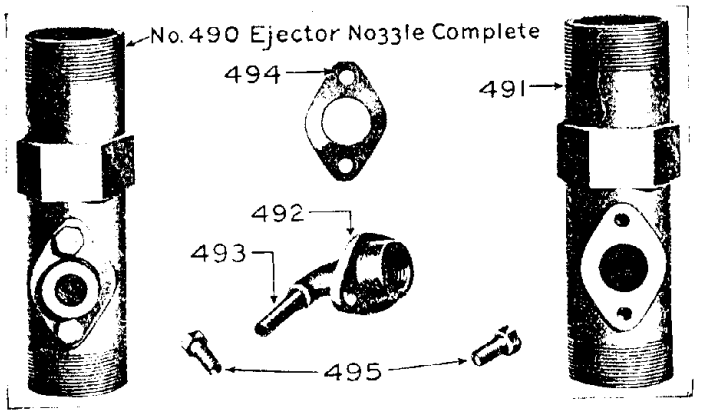
*199 Clutch Complete (See Note 1) (6).
* 19b Outerbearing (6).
25a Clutch Bracket (6).
456 Shaft with Key and Coupling (See Note 1) (6).
457 Outfit Complete less Pulley (6).
458 Shaft only, (See Note 1) (6).
*459 Coupling only (6).
459a Key only for Coupling(See Note 1) (6)
*461 Bolts from Coupling to Wheel (6).
198 Pulley, See Page 66 (See Note 1) (6).

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

WATER EJECTOR



*490 Water Ejector Complete (x).
*491 Water Ejector Body. (x).
*492 Water Ejector Body Nozzle (x).
*493 Copper Tube (x).
*494 Gasket (x).
*495 $\frac{3}{8}$x$\frac{7}{8}$" Cap Screw (x).

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

REVERSE RIGS SPECIFICATIONS

Rig. No.	Shaft Dia.	Shaft Length	Type Clutch	Diam. Fric.	Diam. Coup.	Bolt Circle	No. Bolt	Size Bolt	Diam. Female	Depth Female	Pulley Face	Diam. Brake Wheel	Diam. Pulley Brake	Length Outer Bearing	Width Clutch Band	Type of Pedestal	Rig No.
1	3 3/4"	52 1/2"	SHOE	20"	12"	10 1/4"	5	7/16"	6"	1/4"	14"	21"	NONE	7"		20-AA-20	1
4	3 3/4"	56"	SHOE	24"	12"	10 1/4"	5	7/16"	6"	1/4"	14"	21"	NONE	7"		20-AA-20	4
4C	3 3/4"	58 1/4"	SHOE	24"	13"	11 1/4"	5	7/16"	7"	1/4"	16"	21"	NONE	7"		20-AA-20	4C
5	3 3/4"	56 1/2"	SHOE	20"	12"	10 1/4"	5	7/16"	6"	1/4"	18"	21"	NONE	7"		20-AA-20	5
6	3 3/4"	56 1/2"	BAND	20"	12"	10 1/4"	5	7/16"	6"	1/4"	18"	21"	NONE	7"	3"	20-AA-20	6
7	3 3/4"	60"	SHOE	24"	12"	10 1/4"	5	7/16"	6"	1/4"	18"	21"	NONE	7"		20-AA-20	7
71	3 3/4"	60"	SHOE	24"	12"	10 1/4"	5	7/16"	6"	1/4"	18"	30"	NONE	7"		20-AA-20	71
72	3 3/4"	60"	BAND	24"	12"	10 1/4"	5	7/16"	6"	1/4"	18"	21"	NONE	7"	3"	20-AA-20	72
73	3 3/4"	60"	BAND	24"	12"	10 1/4"	5	7/16"	6"	1/4"	18"	30"	NONE	7"	3"	20-AA-20	73
74	3 3/4"	60"	SHOE	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	18"	21"	NONE	7"		20-AA-20	74
75	3 3/4"	60"	SHOE	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	18"	30"	NONE	7"		20-AA-20	75
76	3 3/4"	60"	BAND	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	18"	21"	NONE	7"	3"	20-AA-20	76
77	3 3/4"	60"	BAND	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	18"	30"	NONE	7"	3"	20-AA-20	77
8	3 3/4"	62 1/4"	SHOE	24"	13"	11 1/4"	5	7/16"	7"	1/4"	20"	21"	NONE	7"		20-AA-20	8
81	3 3/4"	62 1/4"	SHOE	24"	13"	11 1/4"	5	7/16"	7"	1/4"	20"	30"	NONE	7"		20-AA-20	81
82	3 3/4"	62 1/4"	BAND	24"	13"	11 1/4"	5	7/16"	7"	1/4"	20"	21"	NONE	7"	3"	20-AA-20	82
83	3 3/4"	62 1/4"	BAND	24"	13"	11 1/4"	5	7/16"	7"	1/4"	20"	30"	NONE	7"	3"	20-AA-20	83
84	3 3/4"	69 1/2"	SHOE	24"	13"	11 1/4"	5	7/16"	7"	1/4"	20"	30"	NONE	14"		20A-14-3 1/2	84
85	3 3/4"	69 1/2"	BAND	24"	13"	11 1/4"	5	7/16"	7"	1/4"	20"	30"	NONE	14"	3"	20A-14-3 1/2	85
86	3 3/4"	62 1/4"	SHOE	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	20"	30"	NONE	7"		20-AA-20	86
87	3 3/4"	62 1/4"	BAND	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	20"	30"	NONE	7"	3"	20-AA-20	87
88	3 3/4"	69 1/2"	SHOE	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	20"	30"	NONE	14"		20A-14-3 1/2	88
89	3 3/4"	69 1/2"	SHOE	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	20"	30"	NONE	14"		20A-14-3 1/2	89
90	3 3/4"	69 1/2"	BAND	24"	12"	10 1/4"	5	7/16"	6"	1/4"	20"	30"		14"	3"	20A-57	90
95	5"	69 1/2"	BAND	24"	13"	11 1/4"	5	7/16"	7"	1/4"	18"	30"		14"	3"	20A-57	95
50	5"	74 1/4"	BAND	24"	12"	10 1/4"	5	7/16"	6"	1/4"	20"	30"	25"	10"	3"	1279-51	50
50-T	5"	74 1/4"	BAND	24"	12"	10 1/4"	5	7/16"	6"	1/4"	20"	30"	25"	TIM	3"	1279-51	50-T
51	5"	74 1/4"	BAND	24"	13"	11 1/4"	5	7/16"	7"	1/4"	20"	30"	25"	10"	3"	1279-51	51
51-T	5"	74 1/4"	BAND	24"	13"	11 1/4"	5	7/16"	7"	1/4"	20"	30"	25"	TIM	3"	1279-51	51-T
52	5"	74 1/4"	BAND	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	20"	30"	25"	10"	3"	1279-51	52
52-T	5"	74 1/4"	BAND	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	20"	30"	25"	TIM	3"	1279-51	52-T
57	5"	61 1/2"	SHOE	24"	12"	10 1/4"	5	7/16"	6"	1/4"	18"	30"	NONE	10"		20-A-57	57
58	5"	66 1/2"	SHOE	24"	13"	11 1/4"	5	7/16"	7"	1/4"	20"	30"	NONE	10"		20-A-57	58
59	5"	66 1/2"	BAND	24"	13"	11 1/4"	5	7/16"	7"	1/4"	20"	30"	NONE	10"	3"	20-A-57	59
60	5"	66 1/2"	SHOE	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	20"	30"	NONE	10"		20-A-57	60
61	5"	66 1/2"	BAND	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	20"	30"	NONE	10"	3"	20-A-57	61
500	5"	72 1/8"	BAND	24"	13"	11 1/4"	5	7/16"	7"	1/4"	20"	30"	NONE	14"	3"	20-A-100	500
55	5"	76 1/4"	BAND	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	20"	30"	25"	14"	6" C Band	1279A-59	55
40	4 1/4"	74 1/4"	BAND	24"	16"	13 1/4"	6	1"	7 1/4"	1/4"	20"	30"	NONE	TIM	6"	20AT-40	40

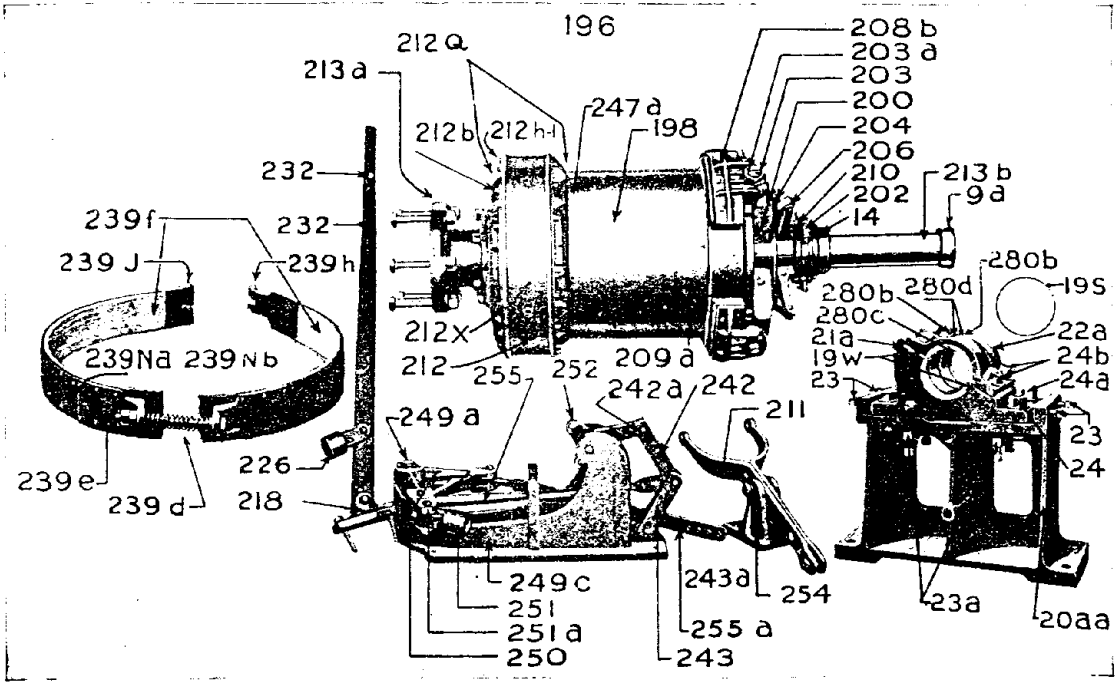
(1) Numbers 5 and 6 rigs take long hub spiders; all others take short hub spiders with spacers, with the exception of the numbers 1, 4, 4C, 50, 51 and 52 which take short hub without spacer.

(2) All rigs having 14 or 18 inch face pulley use pulley bushings 8 1/2 inches long; those having 16 or 20 inch face pulley use bushings 9 1/2 inches long. The numbers 50, 51 and 52 rigs take 3" bushings, 5" inside diameter, 9" long. The number 57 rig takes 2 bushings 5" inside diameter, 10 1/2" long.

(3) The following bolt circles are used on engines

	Coupling	Diam. Coupling	Bolt Circle
Type A—12 to 35 H. P. incl	Std. Reid or A. P. I	12"	10 1/4"
Type A—40 H. P.	Reid	13"	11 1/4"

In addition—Type C engines are furnished with either twelve or thirteen inch coupling.


196
212 a
213 a
208 b
203 a
203
200
204
206
210
202
14
213 b
9 a
247 a
198
212 b
212 h-l
232
232
239 f
239 J
239 h
239 Na
239 Nb
239 e
239 d
218
226
212 X
212
255
252
209 a
242 a
242
211
249 a
249 c
251
251 a
250
243
243 a
254
255 a
280 b
280 b
280 d
280 c
21 a
19 w
23
19 S
22 a
24 b
24 a
23
24
23 a
20 aa

3¾" REVERSE RIG PARTS

See Plate on Page 38 – See Chart on Page 37 for Rig Numbers.

Before ordering Reverse Parts, read Note 2 carefully.

Clutch Parts below are for shoe type clutches; for Band Type Clutch Parts, see page 45.

*196	Reverse Gear complete, including: Shaft with Coupling, Brake Wheel, Brake Band, Pulley, Clutch, Outerbearing, Floor and Derrick Levers and Box of Fittings. (See Illustrations Page 38.)
198	Clutch Pulley (always give diameter and face). See Note 2.
*198a	Clutch Pulley Bushing, Bronze is regular, Cast Iron if ordered.
198b	Clutch Pulley Bushing Keeper (also used on Brake Wheel).
198c	Clutch Pulley Bushing Keeper Screws (also used on Brake Wheel).
198w	Socket Wrench for use in Reverse Pulleys (sent only when ordered).
199	Clutch complete, less Pulley, See Note 2.
*200	Clutch Spider, See Note 2.
200a	Clutch Spider Key, See Note 2.
201	Clutch Spider Set Screw.
*202	Clutch Sleeve, See Note 2.
*203	Clutch Adjusting Screw, (always state size of thread).
*203a	Nut for Clutch Adjusting Screw, 1 and 4 (always state size of thread).
*204	Clutch Arm.
*205	Pin for Clutch Arm.
*206	Clutch Link.
*207	Pin for Clutch Link.
*208	Clutch Shoe, (always state size of thread).
208a	Clutch Shoe with Wood Block (always state size of thread).
*208b	Clutch Shoe with Asbestos Block (always state size of thread of shoe).
209	Clutch Wood Block (always state size of thread of shoe).
*209a	Clutch Asbestos Block (always state size of thread of shoe).
209b	Wood Screws for Blocks.
209c	Bolts for Blocks.
*210	Clutch Yoke.
210a	Bolts for Clutch Yoke.
*211	Clutch Lever.
211a	Bolt for Clutch Lever, Drilled.
*211b	Bolt for Clutch Lever, not Drilled.
*212x	Brake Wheel complete with Pinions (23).
*212	Brake Wheel (23).
212a	Brake Wheel Bushing (23).
212b	Oil Pipe for Brake Wheel (23).
212c	Staples for Brake Wheel Oil Pipe, Old Style (23).
*212g	Oil Guard for Brake Wheel (Shown as 212q) (23).
*212h	Cap Screw for Oil Guard (23).
212i	Spring Washer for Oil Guard (23).
212e	Brake Wheel Hub 30".
212f	Brake Wheel Ring 30".
212m	Brake Wheel Ring Bolts 30".
213	Double Flanged Coupling with Shaft (23).
*213a	Double Flanged Coupling.
213aa	Double Flanged Coupling, Steel,
*213b	Reverse Shaft, See Note 2.
213c	Key for Coupling (23).
213d	Coupling Bolts.
214	Bevel Gear (23).
214a	Long Bolts for Bevel Gear (23).
214b	Short Bolts for Bevel Gear. (23).
215	Bevel Pinion (23).
215a	Bevel Pinion Bushing. (23).
216	Spacing Washer for Pinion 1¼" Bore (23).
217	Spacing Washer for Pinion 1½" Bore (23).
*218	Reverse Lever Base, left hand (23).
218a	Rivet for Reverse Lever Base (23).
1218	New Style Reverse Lever Base (23)
1218b	½" x 3" Machine Bolts with Washer.

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

3¾" REVERSE RIG PARTS—Continued

219 Speed Regulator Frame, right and left hand (not used now).
220 Boxes for Reverse Lever Shaft, right hand.
*226 Head for Derrick Reach Rod. (23).
*226a Rivet for Derrick Lever Head (23).
1226 Head for Derrick Reach Rod used with 1232 Lever (23).
227 Head for Speed Regulator Reach Rod (23).
227a Rivet for Speed Lever Head (old style) (23).
*228 Head for Brake Adjusting Screw (23).
228a Bolt for Adjusting Screw Head (old style) (23).
*229 Lug for Brake Band (23).
229a Rivet for Brake Band Lug (23).
229n Lug for New Style Brake Band (23).
232 Reverse Lever, right hand (23).
*232a Reverse Lever, left hand (23).
232x Reverse Lever, complete (23).
1232a New Style Derrick Lever.
1232b Derrick Lever Handle (23).
1232x New Style Derrick Lever complete for Drilling Engine.
233 Speed Regulating Lever (3).
233a Turnbuckle Head for Speed Regulating Lever (obsolete, see 263).
234 Speed Regulating Handle in Derrick (obsolete).
235 Swing Bar (used with right hand engine only) (obsolete).
237 Pinion Pin (23).
238 Retaining Pin for Pinion Pin (23).
*239 Brake Band only (old style).
239a Brake Band with Blocks (old style).
*239n Brake Band complete (two piece)
*239na Upper part of Brake Band (23).
*239nb Lower part of Brake Band (23).
*239d Spring for Two Piece Brake Band (23).
*239e Adjusting Bolt for Two Piece Brake Band (23)
*239f Asbestos Lining for Brake Band (2 pieces) (23).
239g Washer for Adjusting Bolt (23).
*239h Pin for Attaching Brake Band to Lever (short) (23).
*239j Pin for Attaching Brake Band to Lever (long) (23).
239k Copper Rivet for Brake Band Lining (23).
239s Brake Band Suspender (23).
240 Brake Band Adjusting Screw (long) (23).
240a Brake Band Adjusting Screw (short) (23).
241 Nipple for Adjusting Screw (23).
241a Nut for Adjusting Screw (23).
*242 Toggle Link (long) (23).
*242a Pin for Toggle Link (23).
*243 Toggle Link (short) (23).
*243a Pin for Toggle Link (23).
247 Oil Pipe for Pulley (state diameter of Pulley).
*247a Plug for Oil Pipe (23).
247b Screw Driver (23).
248 Brake Band Lagging or Blocks (old style).
248a Asbestos Brake Band Blocks.
*249x Reverse Base complete (Illustrated as 249c)
*249 Reverse Base with Pin (23).
*249a Fulcrum Pin for Reverse Base (23).
249b ⅜" x 2½" Cotter Pin.
249c Reverse Base Yoke (23).
*250 Bell Crank, right and left (23).
*251 Bell Crank Head (23).
*251a Pin for Bell Crank Head (23).
*252 Brake Band Lever.
*252a Pin for Attaching Brake Band Lever to Fulcrum (23)
*254 Fulcrum for Clutch Lever.
*255 Reach Rod for Toggle.
*255a Reach Rod for Clutch Lever. See Note 2.
255b Pin for Attaching Reach Rod to Bell Crank (23).
256 Arm for right hand Reverse Lever Shaft (23).

See page 46 for New Style One Piece Brake Band

See Page 47 for New Style Reverse Base.

Used with 24" Friction Clutches.

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

3¾" REVERSE RIG PARTS—Continued

255an New Style Reach Rod, Complete. See Note 2.
255an-a New Style Reach Rod, long piece, See Note 2.
255an-b New Style Reach Rod, short piece.

Bolts used in connecting up reverse rigging are such as can usually be bought at any hardware store; if ordered from us give diameter and length.

Note 2.

Wide face Pulleys are furnished on all Type A engines as shown below:

All Reverse Gear Type, except 40 HP.—18" face.

40 HP. Reverse Gear Type —20" face.

The above change requires changes in the following parts:—shaft, spider, pulley, key, sleeves and reach rod No. 255a and 255an-a.

To accommodate these changes, shafts will be numbered as follows:

No. 1—20" Reverse with 14" face pulley.
No. 2—20" Heavy Reverse with 14" face pulley used on old style drilling rig.
No. 4—24" Reverse with 14" face pulley.
No. 4c—24" Reverse with 16" face pulley.
No. 5—20" Reverse with 18" face pulley.
No. 7—24" Reverse with 18" face pulley.
No. 8—24" Reverse with 20" face pulley.

Clutch Spiders will be numbered as follows:

200-1—20" Reverse with 14" face pulley.
200-4—24" Reverse with 14" or 16" face pulley.
200-5—20" Reverse with 18" face pulley.
200-7—24" Reverse with 18" or 20" face pulley.

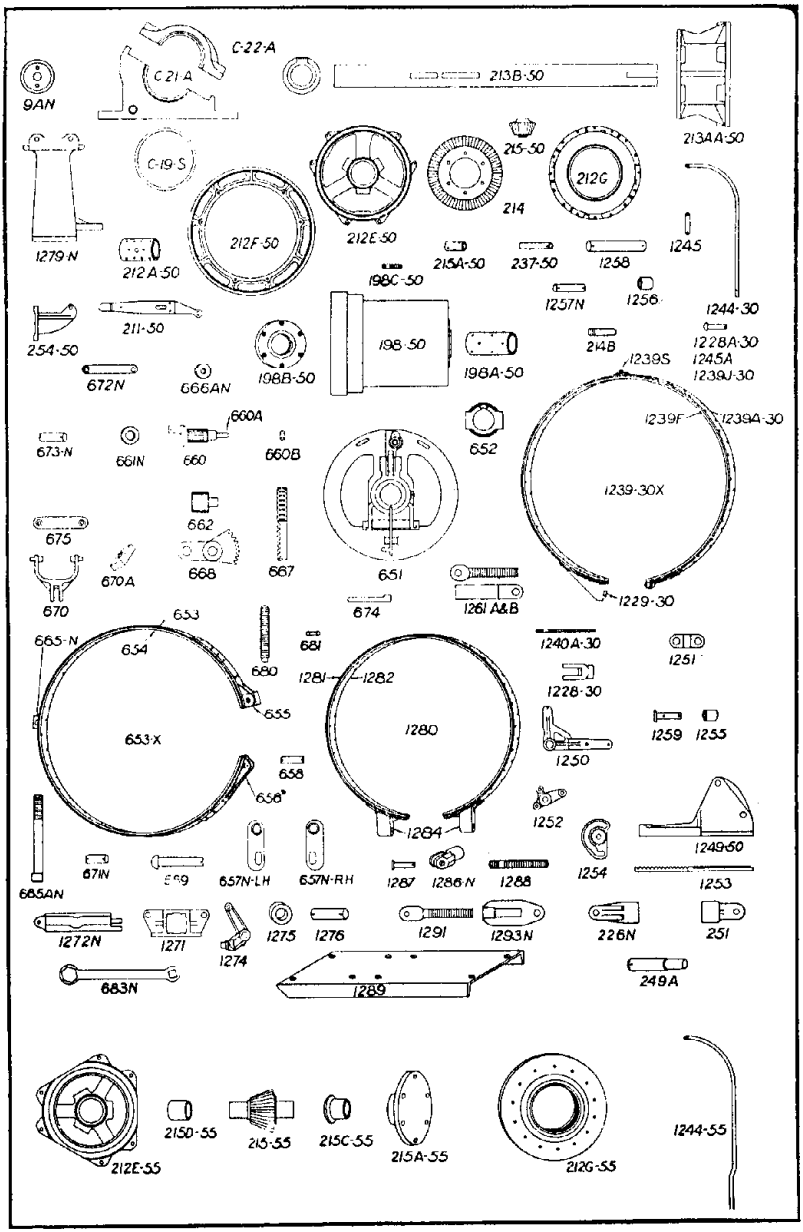
On all repair orders, whether for complete attachments or for separate parts, please use these part numbers and show diameter of pulley, width face, and friction.

Orders for reverse clutch parts should state diameter of friction rim (do not confuse this with diameter of pulley) and rig number—See chart on Page 37.

The size will be found stamped on the rim of the flange that bolts to the fly wheel. In ordering reverse pulleys always give diameter and face of pulley, and size of shaft.

See Index Page 3.

NOS. 50, 51, 52 AND 55 REVERSE RIG PARTS



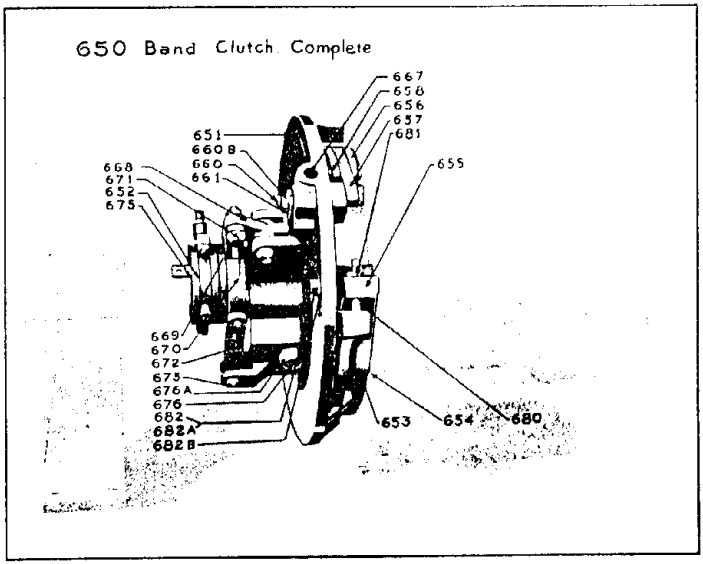
NOS. 50, 51 AND 52 REVERSE RIG PARTS

198 -50	Reverse clutch pulley (give diameter and face)
198a -50	Reverse pulley bushing. (three to set)
198b -50	Reverse pulley bushing keeper (brass) (two to set)
198c -50	Bushing keeper stud and lockwasher
247 -50	Reverse pulley oil pipe and plug
247a	Reverse oil pipe plug
211 -50x	Clutch lever complete
211 -50	Clutch lever
254 -50	Clutch lever fulcrum
212x -50	Brakewheel complete, 30"
212x -50	Brakewheel complete, 30" with out oil guards
212a -50	Brakewheel hub bushing
212c -50	Brakewheel hub only
212f -50	Brakewheel ring
212g	Brakewheel oil guard
212h	Brakewheel oil guard cap screw
212i	Brakewheel oil guard cap screw lockwasher
212k	Brakewheel oil guard pipe plug
212L	Brakewheel hub pipe plug
212m-50	Brakewheel ring bolt, nut and lockwasher
213 -50	Reverse flange coupling with shaft
213aa-50	Reverse flanged coupling, steel
213b -50	Reverse shaft only
213c -50	Reverse flanged coupling key
214	Bevel gear
214a	Long bolts for bevel gear
214b	Studs for bevel gear
214c	Elastic stop nuts
215 -50	Bevel pinion, only
215a -50	Bevel pinion bushing
237 -50	Bevel pinion pin
238 -50	Bevel pinion pin retainer
650 -26	Band clutch complete.
1228 -30	Adjusting screw head
1228a -30	Adjusting screw head rivet
1229 -30	Brakeband lug
1239s	Brakeband suspender
1239a -30	Brakeband only
1239 -30x	Brakeband complete for Brake Wheel
1239f -30	Brakeband lining for Brake Wheel
1239j -30	Brakeband rivet for Brake Wheel
1240a -30	Adjusting screw, long
1240x -30	Adjusting screw, complete
1244 -30	Brakeband support
1245	Brakeband suspender link
1245a	Brakeband suspender rivet
1248 -50	Base only
1249 -50x	Reverse base complete
1250	Bell crank
1251	Brakeband support clamp
1252	Brakeband lever
1253	Cam rack
1254	Cam, 1¼" throw
1255	Rack pin roller
1256	Brakeband lever roller
1257n	Brakeband lever roller pin
1258	Brakeband lever and cam pin
1259	Rack pin
1260	Brakeband support clamp stud nut and lockwasher
1261	Reach rod complete
1261a	Reach rod body
1261b	Reach rod head
226n	Derrick reach rod head
249a	Fulcrum pin and cotter
251	Bell crank head
251a	Bell crank head rivet pin
255b	Reach rod rivet pin
1270	Pulley brake operating device complete
1271	Bracket
1272n	Base slide
1273	Slide rivet and cotter
1274	Slide lever
1275	Slide lever roller
1276	Slide lever roller pin with cotter
1279	Bearing pedestal
1280	Brakeband complete for Pulley Brake
1281a	Brakeband only with lugs, for Pulley Brake
1282	Brakeband lining for Pulley Brake
1283	Brakeband lining rivet
1284	Brakeband lug
1285	Brakeband lug rivet
1286	Brakeband adjusting screw head
1287	Adjusting screw head rivet with cotter
1288	Brakeband adjusting screw with two nuts
1289	Pulley brake bracket channel
1289a	Channel bolt
1290	Reach rod complete
1291	Reach rod body
1293n	Reach rod head

NO. 55 REVERSE RIG PARTS

198	-55	Reverse pulley
198a	-50	Reverse pulley bushing
198b	-50	Reverse pulley bushing keeper
198c	-50	Keeper bolts and nuts
200b	-55	Spacer
211	-50x	Clutch lever complete
211	-50	Clutch lever
211a	-50	Bolt for lever
211b	-50	Bolt for lever
211c		Bolts for lever
254	-50	Clutch lever fulcrum
254a	-50	Bolts for fulcrum—pedestal
212x	-55	Brake wheel complete
212a	-55	Brake wheel hub bushing
212e	-55	Brake wheel hub
212f	-55	Brake wheel ring
212g	-55	Brake wheel oil guard
212h		Oil guard cap screws
212i	-55	Lock washers for cap screws
212k	-55	Oil guard pipe plugs
212m	-55	Bolts, nuts and lockwashers for brake wheel ring
213	-55	Double flange coupling, with shaft
213aa		Double flanged coupling
213b	-55	Shaft
213c	-55	Double flanged coupling key
214		Bevel gears
214a	-55	Studs
214b	-55	Short bolt for bevel gear
214c	-55	Elastic stop nuts
215		Bevel pinion
215a	-55	Cap for pinion
215b		Cap screws
215c	-55	Bevel pinion bearing bushing
215d	-55	Brake wheel hub pinion bushing
247		Reverse pulley oil pipe
247a		Oil pipe plugs
1228	-30	Adjusting screw head*
1228a	-30	Rivet for adjusting screw head
1229	-30	Brake band lug
1239a		Brake band suspender
1239x	-30	Brake band complete for brake wheel
1239	-30	Brake band only
1239f	-30	Brake band lining
1239j		Brake band rivet
1220x	-30	Adjusting screw complete
1240a	-30	Adjusting screw
1244	-55	Brake band support
1245		Brake band suspender links
1245a		Brake band suspender rivets
1249	-50x	Reverse Base complete
1249	-50	Base
1250		Bell crank
1251		Brake band support clamp
1252		Brake band lever
1253		Rack
1254		Cam 1¼" throw
1255		Rack pin roller
1256		Brake band lever roller
1257n		Brakeband lever roller pin
1258		Brake band lever and cam pin
1259		Rack pin
1260		Support clamp studs, nuts and lockwashers
1261		Reach rod complete
1261a	-55	Reach rod body
1261m	-55	Reach rod head
226n		Derrick reach rod head
249a		Fulcrum pin and cotter
251		Bell crank head
251a		Bell crank head rivet pin
226a		Reach rod rivet pin
1270		Pulley brake operating device complete
1271		Bracket
1272n		Base slide
1273		Slide rivets and cotters
1274		Slide lever
1275		Slide lever roller
1276		Slide lever roller pin and cotter
1279		Bearing pedestal
1280		Brake band complete for Pulley Brake
1281		Brake band
1282		Brake band lining
1283		Lining rivets, per dozen
1284		Brake band lugs
1285		Lug rivets
1286		Brake band adjusting screw head
1287		Adjusting screw head rivets and cotter pins
1288		Adjusting screw with two nuts
1289	-55	Pulley brake bracket channel
1289A		Channel bolts
1290		Reach rod complete
1291	-55	Reach rod body
1293n		Reach rod head

BAND CLUTCH



*650 Clutch complete.
*651 Spider.
651a Set screw.
*652 Sleeve.
*653 Clutch Band.
653x Clutch band complete, including parts 653-4-5-6.
*654 Clutch Band Lining.
*655 Stop Connection.
*656 Crank Connection.
*657 Link.
*658 Link Pin (24).
659 Cotter Pin (24).
*660 Gear Crank Shaft.
660a Stud for Gear Crank Shaft (½"x 1 3/16") (24).
*660b Nut (½") (24).
*661 Washer.
662 Idler Pinion 24" Clutch only.
665a Spring (24).
665n Band Tie (24).
665b Eyebolt (24").
665c Spring Connection (24).
666an Band Tie Washer 5-16 x 1¾" (25).
666a Band Tie Rivets (25).
*667 Rack.
*668 Clutch Arm.
*669 Rivet 1"x4 3/8" (24).
669a Cotter Pin 5-32" x 1¼" (24).
*670 Yoke.
670a Yoke Blocks.
671 Rivet 1"x3 3/16" (24).
*672 Yoke Link.
*673n Yoke Link Rivet (24).
674 Spider Key.
*675 Sleeve Key.
*676 Spider Stud Bolt.
*676a Nuts. (24).
676b Lock Washer (24).
677 Flat Head Machine Screws 14-20 x ¾" (24).
678 Lug Rivet (24).
679 Lining Rivets (24).
*680 Adjusting Screw.
*681 Nut.
*682 Stop Connection Stud. ¾ Thread, Space 1". Thread 1¼".5/8"x3"(24).
*682a Nut (24).
*682b Washer (24).
*683 Wrench.
684 Stud for Spider.
685 Nut.
685a Lockwasher
686 Sleeve Yoke (same as 210).
687 Bolt for Yoke (same as 210a).
688 Brass Oil Cup (same as 91).
689 Wrench for Clutch Adjustment.
690 Wrench for Adjusting Screw Locknut

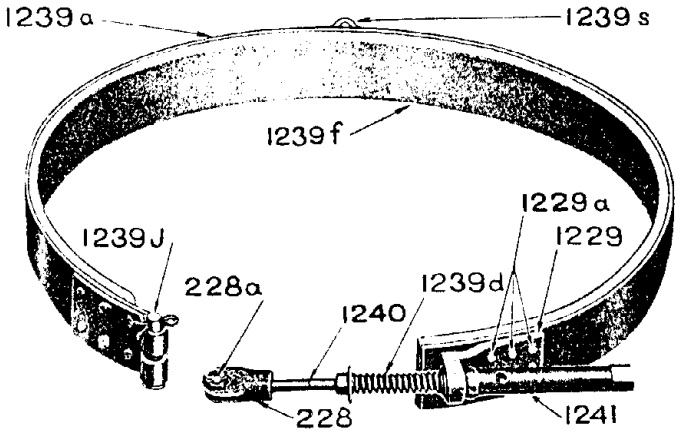
NOTE—Be sure to state diameter and width of Clutch Friction (20"-24"-36" diameter, 3" or 6" width) and diameter of Shaft.

For key to symbol numbers (0) after each part, see Page 30

See Index Page 3.

NEW STYLE BRAKE BAND

1239 BRAKE BAND COMPLETE



229 Lug for Brake Band (21").
1229-30 Lug for Brake Band (30").
*1229a Rivet for Lug. (¼"x⅝")
*1239 Brakeband complete (21"-30").
*1239a Brakeband only (21"-30").
*1239d Spring.
*1239f Asbestos Lining (21"-30").
*1239j Rivets (½"x4⅜") (30").

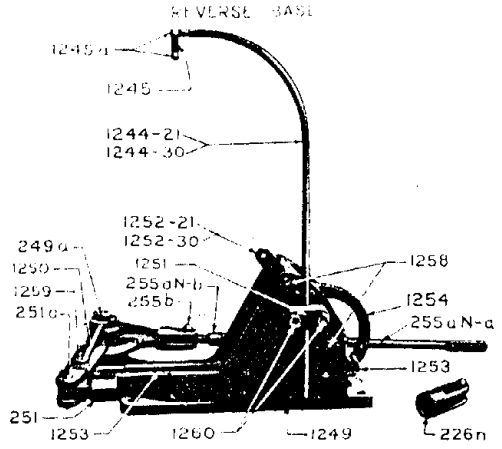
239j Rivet (½"x3¾") (21").
*1239s Brakeband Suspender.
*1240 Adjusting Screw (21"-30").
*1241 Nuts for Adjusting Screw.
*1242 Links.
* 228 Head.
* 228a Bolt for Head.
* 242a ½x1½" Rivets.

See Index Page 3.

*Illustrated.

NEW STYLE REVERSE BASE

For Rigs with 24" Friction Clutches, Shoe or Band Type



1249x	Reverse Base complete (See Note)	1256	Brake Band Lever Roller.
1249x-50	Reverse Base complete (See Note)	1257	Brake Band Lever Roller Pin.
*1244	Brake Band Support (21"-30") (See Note).	*1258	Cam and Brake Band Roller Pin.
*1245	Suspender Links.	*1259	Bell Crank Rack Pin Rivet and Cotter.
*1245a	Suspender Rivets ($\frac{3}{8}$"x1$\frac{1}{2}$").	*1260	Brake Band Support Studs ($\frac{5}{8}$"x-3$\frac{5}{8}$").
*1249	Base only.	*226n	Head for Derrick Reach Rod.
1249-50	Reverse Base only.	*249a	Fulcrum Pin and Cotter.
*1250	Bell Crank.	*251	Bell Crank Head.
*1251	Brake Band Support Clamp.	*251a	Bell Crank Head Rivet Pin.
*1252	Brake Band Lever (21"-30") (See Note).	255an	Reach Rod complete (See Note).
*1253	Rack.	*255an-a	Reach Rod(long piece)(See Note)
1253a	Guard for Rack.	*255an-b	Reach Rod(short piece)(See Note)
*1254	Cam.	*255b	Reach Rod Rivet Pin.
1255	Bell Crank Rack Pin Roller.		

NOTE—The No. 1249x-50 Reverse Base is only used on Rigs with Pulley Brakes. The No. 56 Base uses parts 1244-30", 1252-30". Does not use Part No. 255an. Other parts same as No. 1249x.

REVERSE BASE

For Reverse Rigs with 20" Friction Clutches, Shoe or Band Type

249x	Reverse Base complete.	252a	Pin for attaching Brakeband Lever to Fulcrum.
249	Reverse Base with Pin.	255	Reach Rod for Toggle.
249a	Fulcrum Pin for Reverse Base.	255b	Reach Rod Rivet Pin.
249c	Reverse Base Yoke.	255an	Reach Rod complete.
250	Bell Crank, right and left.	255an-a	Reach Rod (long piece).
251	Bell Crank Head.	255an-b	Reach Rod (short piece).
251a	Pin for Bell Crank Head.		
252	Brakeband Lever.		

For key to symbol numbers (0) after each part, see Page 30.

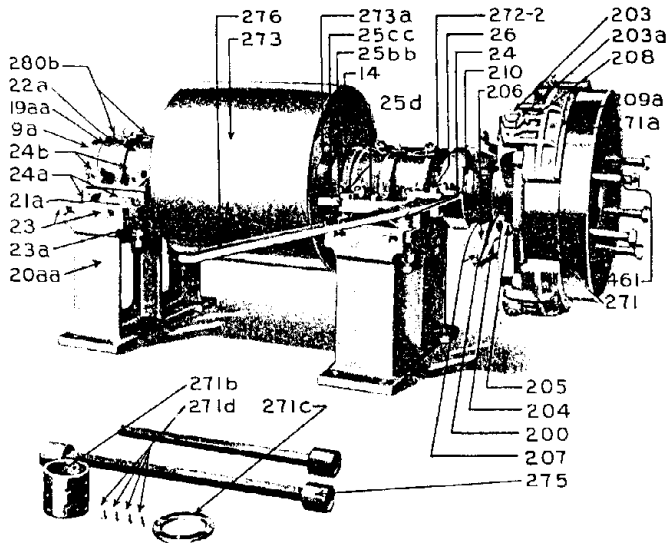
*Illustrated.

See Index Page 3.

CHART OF CUT-OFF RIGS (Two Bearing)

Rig No.	SHAFT		CLUTCH			Bearing Length	Pedestal No.	Pulley Face
	Dia.	Length	Type	Friction	Width			
270-30	3¾	56	Shoe	20"		7"	F-20-AA	18
270-31	3¾	61¼	Band	20"	3"	7"	F-20-AA	18
270-40	4¼	61¼	Shoe	20"		8"	E-20-A	18
270-41	4¼	61¼	Band	20"	3"	8"	E-20-A	18
270-42	4¼	61¼	Shoe	24"		8"	E-20-A	18
270-43	4¼	61¼	Band	24"	3"	8"	E-20-A	18-20
270-44	4¼	71½	Shoe	24"		14"	20ATN-4¼	18-20
270-45	4¼	71½	Band	24"	3"	14"	20ATN-4¼	18-20
270-46	4¼	70½	Band	24"	3"	Timken	20ATN-4¼	18-20
270-50	5	66¼	Shoe	24"		10"	C-20-A	20
270-51	5	66¼	Band	24"	3"	10"	C-20-A	20
270-52	5	79½	Band	24"	3"	14"	C-20-A	20
270-53	5	79½	Band	24"	6"	14"	C-20-A	20
270-54	5	79½	Band	36"	3"	14"	C-20-A	20
270-55	5	79½	Band	36"	6"	14"	C-20-A	20
270-56	5	78½	Band	24"	3"	Timken	20AT-5	20
270-57	5	78½	Band	24"	6"	Timken	20AT-5	20
270-58	5	78½	Band	36"	3"	Timken	20AT-5	20
270-59	5	78½	Band	36"	6"	Timken	20AT-5	20

CUT-OFF RIG



NO.270 CUT-OFF RIG COMPLETE

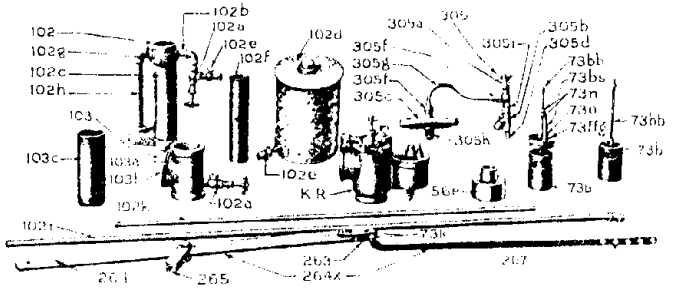
See Chart of Cut-Off Rigs on Page 48

270 Cut-off Rig complete (6).
271 Cut-off Hub complete, including 271-a-b-c-d-e and 247a (6).
271a Cut-off Hub (6).
271b Bronze Bushing for Cut-off Hub (6).
271c Keeper Ring for Cut-off Hub (6).
271d Screws for Keeper Ring.
271e 3/8" Oil Pipe.
247a Oil Pipe Plug.
272 Shaft (6).
272-2 Shaft (2 Outerbearings) (6).
272-20 Shaft for Twin Engines for use without Bearings (6).
272-22 Twin Engine Shaft for use with two Bearings (6)
273 Pulley (6).
273a Key for Pulley (6).
274 Stand for Clutch Lever Assembly including 274a-b-c.
274a Pipe for Clutch Lever Stand (6).
274b Cap for Stand (6).
274c Stud and Nut for Stand (6).
276 Bent Clutch Lever (6).
14 Set Collar (6).

200 Clutch Spider (6).
200a Key for Clutch Spider (6).
202 Clutch Sleeve (6).
203 Clutch Adjusting Screw (6).
204 Clutch Arm, 2 and 4 (6).
205 Pin for Clutch Arm (6).
206 Link (6).
207 Pin for Link (6).
208 Clutch Shoe, 1 and 4, (always state size of thread) (6).
209a Asbestos Clutch Blocks (always state size of thread of shoe) (6).
210 Yoke (6).
9a Cap for End of Shaft (6).
19aa Inclined Outerbearing Pedestal (6).
20aa Inclined Outerbearing Pedestal (6).
21a Inclined Outerbearing Box Bottom(6)
22a Outerbearing Box Cap (6).
23 Outerbearing Adjusting Screw.
23a Set Screw.
24 Bolt for Outerbearing, Bracket Side.
24a Bolt for Outerbearing, Plain Side.
24b Bolt for Outerbearing Cap.
25bb Base for Two Piece Clutch Bracket(6)
25cc Arm for Two Piece Clutch Bracket(6)
25d Bolt for Connecting Arm and Base (6).
26 Fulcrum Bolt (6).
275 Socket Wrench (6).
280b Oil Saver Spring (obsolete).

For key to symbol numbers (0) after each part, see page 30.

GASOLINE EQUIPMENT



This equipment is explained fully in our special bulletin on Gasoline carburetors.

Reverse Gear Engines are fitted per Blue Print 1147-B. Complete equipment includes water valve, gasoline igniter, brass main valve plunger, air valve without slots with stem and bushing, carburetor with nipple, and levers for speed wheel arrangement.

Sistersville Type Engines are fitted per Blue Print 1318. Complete equipment includes water valve, brass main valve plunger, gasoline igniter complete, air valve without slots with stem, and carburetor with nipple.

Two inch Carburetor Tee with nipple is fitted, according to Print No. 1492.

GASOLINE IGNITER

*102 Gasoline Igniter complete (1).
*102a Gasoline Igniter Needle Valve (1).
*102b Nickle Generating Tube (1).
Note—Do not confuse No. 102b with No. 84.
*102c Gasoline Igniter Case (1).
*102d Gasoline Igniter Can (1).
*102e Gasoline Igniter Pet Cock (1).
*102f Gasoline Igniter Chimney, sheet iron (1).
*102g Gasoline Generating Tube Clamp (1).
*102h Gasoline Igniter Nipple for Case (1).
*102i Long Pipe for Gasoline Igniter Can (2 pieces) (1).
*102k Short Pipe for Gasoline Igniter Can (1).

STATIONARY AIR VALVE

*73bs Stationary Air Valve complete (4).
*73b Air Valve (4).
*73bb Air Valve Stem (4).
*73ffg Air Valve Bushing (4).
*73n ¼" Faced Nuts (4).
*73o Arm for Stationary Air Valve (4).

***56e Bronze Main Valve Plunger**

GASOLINE SPEED LEVER

*264x Gasoline Speed Lever complete (5).
*263 Reverse Heads (1).
264 Speed Lever (5).
265 Fulcrum Heads (1).
266 Machine Bolt ⅜x1¼" (1).
*267 Link (3).
*73k No. 5x1" Taper Pin (1).
3-32"x¾" Spring Cotters (1).

For key to symbol numbers (0) after each part, see Page 30.

***Illustrated.**

See Index Page 3.

HAND REGULATED WATER VALVE

See Plate on Page 50.

*305 Hand Regulated Water Valve complete (1).
*305a Needle Valve (1).
*305b Swing Check Valve (1).
*305c Hand Hole Plate (1).
*305d 1/4"x1 1/2" Nipple (1).
*305f Union Ring and Tail 1/4" (1).
305f Union Ring and Tail, 3/8" (1).
*305g Copper Tube (1).
*305h Strainer (1).
*305i 1/4" Close Nipple (1).

2" CARBURETOR TEE WITH NIPPLE, PER PRINT NO. 1492

See Plate on Page 50.

*103 Carburetor Tee complete with Nipple (1).
*103a Carburetor Tee Body (1).
*103b Gate (1).
*103c 2"x6" Nipple (1).
103d 2 1/2"x2" Bushing (1).
103e Copper Tube for No. 103a.
*102a Needle Valve (1).

K. R. CARBURETOR

See Plate on Page 50.

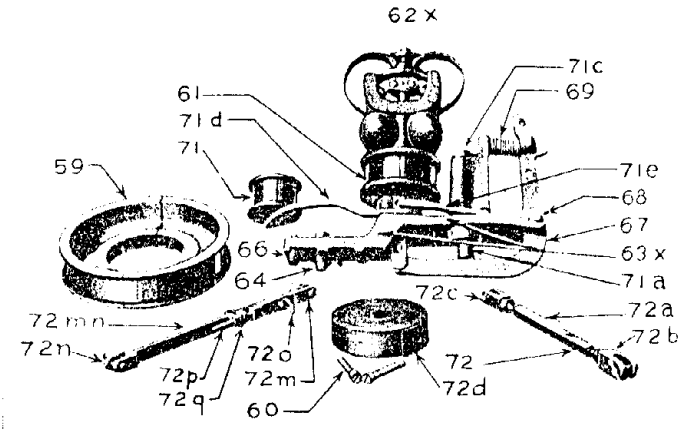
*KR K.R. Carburetor, 2" complete with 2"x6" Nipple (1).
KR1 Adjusting Screw (1).
KR2 Adjusting Screw Handle (1).
KR3 Adjusting Screw Clamp (1).
KR4 14-20 x 1/4" Machine Screw for closing Adjusting Screw Clamp (1).
KR5 Air Valve Spring (1).
KR6 Lock Nut (1).
KR7 Throttle Arm (1).
KR8 Air Valve (1).
KR9 Air Valve Stop Screw, 14-20x1" (1).
KR10 14-20x1/2" Machine Screw for clamping Air Valve Stop Screw (1).
KR11 Body (1).
KR12 Spray Nozzle (1).
KR13 Float Chamber Cap (1).
KR14 Flusher (1).
KR15 Flusher Bushing (1).
KR16 Flusher Spring (1).
KR17 Float complete (1).
KR17a Float only (1).
KR17b Ball (1).
KR17c Brass Collar (1).
KR17d Brass Washer.
KR17e Wire (1).
KR18 Drain Plug 1/8" Pipe (1).
KR19 Lock Bracket for Air Valve (1).
KR20 Reid Special Throttle Arm (1).
KR21 14-20x1/2" Round Head Machine Screw (1).
KR22 Thumb Screw.

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

GOVERNORS



*59	Shaft Governor Pulley (5).
*60	Screw for Shaft Governor Pulley (10)
*61	Pulley for Governor Top (3)
61a	Set Screw for No. 61 (1).
*62p	Governor only, Safety Type, No Belt, Shaft Pulley or Adjusters (10).
*62x	Governor-Safety Type Complete with Belt, Shaft Pulley and adjuster (10).
*63x	Safety Governor Frame, Right Hand (11).
63ax	Safety Governor Frame, Left Hand, (11).
*64	Cap Screw for Governor Frame (10).
65	Set Screw for holding Top in Frame. (10).
*66	Taper Pin for holding Frame in Bed (10).
*67	Governor Lever (26).
*68	Taper Pin for Governor Lever (1).
*69	Spring for Governor Frame (1).
70	Head for Governor Top (2).
70n	Nuts for No. 70 (2).
*71	Safety Governor Idler Pulley (1).
*71a	Safety Pin (2).
71b	Safety Governor Spring (1).
*71c	Safety Governor Spring Plug (1).
*71d	Safety Governor Trigger with Idler Spindle (1).
71dd	Safety Governor Idler Spindle (1).
*71e	Safety Governor Latch (1).
71f	Safety Governor Pivot Screws (1).
*72	Turnbuckle with Heads (obsolete) (4).
*72a	Turnbuckle Body no Heads (obsolete) (1).
*72b	Turnbuckle Head to fit Governor Lever (obsolete) (1).
72bb	3/8" Left Hand Nuts (1).
*72c	Turnbuckle Head to fit Fuel Valve-Cross Bar (obsolete) (1).
72cc	3/8" Right Hand Nuts (1).
*72d	Governor Belting (10).
72e	Governor Belt Studs (1).
*72mn	Governor Adjuster complete (27).
*72m	Link for Fuel Valve Lever (1).
*72n	Link for Governor Lever (27).
*72o	1/4x5/8" Wing Screw (1).
*72p	Adjusting Stud (1).
*72q	Adjusting Nut (1).
72r	Spring Washer for Wing Screw (1).
72s	Plain Washer for Wing Screw (1).

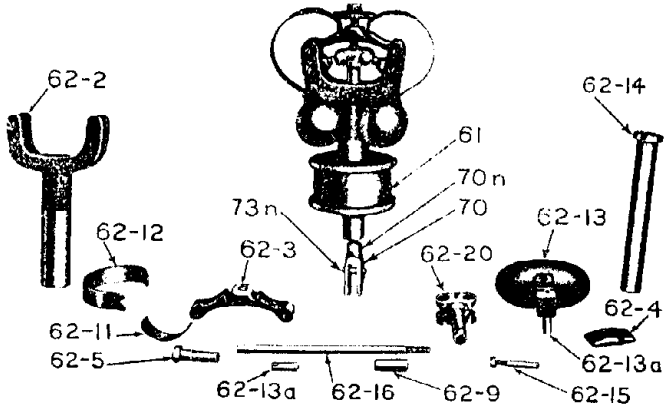
For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

GOVERNOR TOP

62-1 TOP COMPLETE



*62- 1 Top Complete with Head(3).
*62- 2 Body or Y.
*62- 3 Bridge.
*62- 4 Cap.
*62- 5 Adjusting Screw.
*62- 9 Roller.
*62-11 Spring Clips.
*62-12 Long Leaf Spring.
*62-13 Ball.
*62-13a Governor Ball Pin.
*62-14 Spindle.
*62-15 Pivot Screw.
*62-16 Center Rod.
*62-20 Center Body Assembly

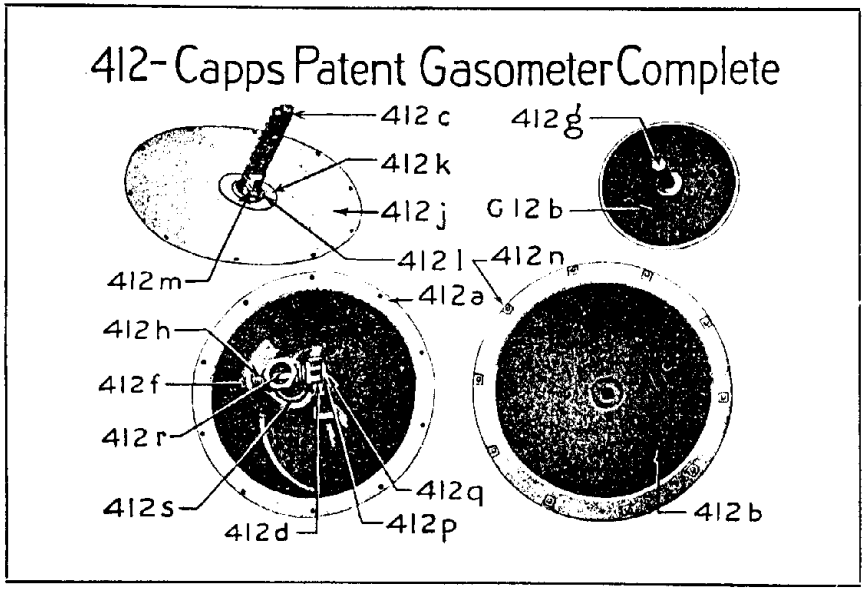
All parts are furnished in 2 sizes, for 1½" and 2" Governors. 1½" parts are used on 12, 15 and 20 HP, and 2" parts on 25, 30, 31, 35 and 40 HP.

For key to symbol numbers (0) after each part, see Page 30

*Illustrated

See Index Page 3.

CAPPS' PATENT DRY GASOMETER



All Illustrated Except 412t

All Parts in 2 Sizes, 25 HP. and 40 HP.

412 Gasometer Complete.
412a Bowl.
412b Cover.
412c Diaphragm Rack.
412dn Cock Pinion.
412fn Cock Nut.
412g Stem.
412hn Cock Spring.
G-12b Saucer.
412j Rubber Diaphragm.
412k Rubber Washer.
412l $\frac{5}{8}$" Steel Washer.
412m 5-32" Cotter Pin.
412n 14-20 Machine Screw 1" long.
412p 14-20 Machine Screw $\frac{3}{4}$" long.
412q $\frac{3}{8}$" Washer.
412rn Gas Cock.
412s Close Nipple.
412t Cap for Cover.

40 HP LARGE CAPACITY CAPPS' PATENT DRY GASOMETER

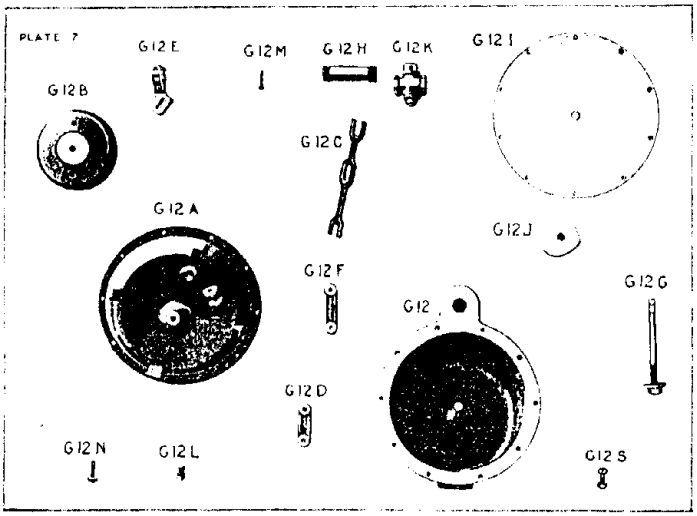
1412 Gasometer Complete.
1412a Bowl.
1412b Cover.
412c Diaphragm Rack.
1412dn Cock Pinion.
1412fn Cock Nut.
1412g Stem.
1412hn Cock Spring.
1412u Saucer.
1412j Diaphragm.
412k Rubber Washer.
412l Steel Washer.
412m Cotter Pin for Rack
1412n 5-16x1 5-16 Bolts.
412p 14-20 Machine Screw and Nut $\frac{3}{4}$" long.
412q $\frac{3}{8}$" Washers.
1412rm Gas Cock.
1412s $1\frac{1}{2}$x$1\frac{3}{4}$" Close Nipple.
412t Cap for Cover.

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

DRY GASOMETERS



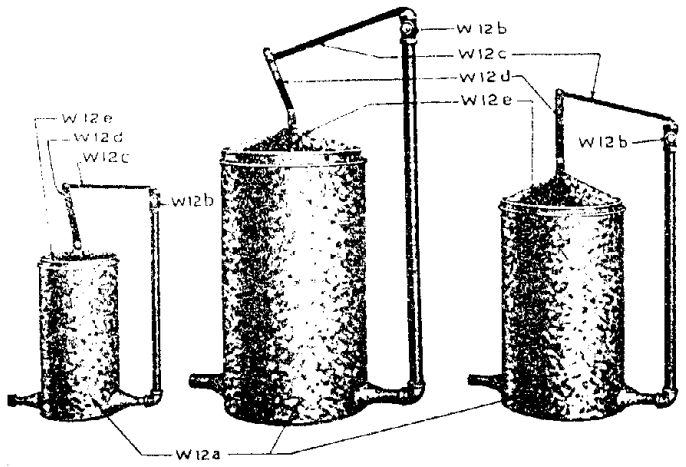
G12x	Gasometer Complete (3).
*G12	Bowl (3).
*G12a	Cover (3).
*G12b	Saucer (1).
*G12c	Cross Lever (1).
*G12d	Short Link (1).
*G12e	Cock Handle (1).
*G12f	Long Link (1).
*G12g	Stem (1).
*G12h	Nipple (3).
*G12i	Diaphragm (2).
*G12j	Rubber Washer (1).
*G12k	Cock (3).
*G12l	Plug (1).
*G12m	Cock Handle Rivet (1).
*G12n	Short Link Rivet (1).
G12p	Long Link Rivet—See G12n (1).
*G12s	14-20x1" Machine Screws and Nuts (1).

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

WET GASOMETERS



*W12 Gasometer Complete (3).
*W12a Gasometer Reservoir (3).
*W12b Gasometer Stop Cock (3).
*W12c Gasometer Arm (3).
*W12d Gasometer Lever (3).
*W12e Gasometer Float (3).
W12f Outside Pipe (3).
W12g Inside Pipe (3).

SPLIT PULLEY FOR TWIN ENGINE

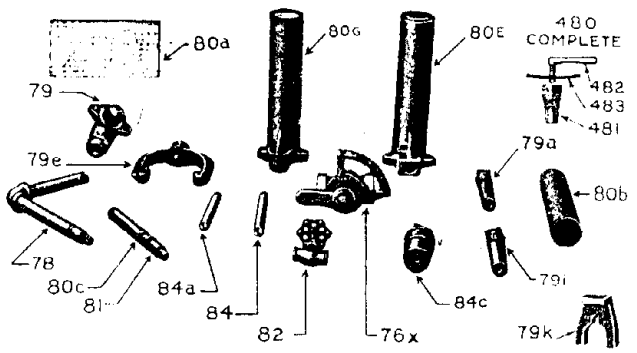
600 Split Pulley complete (6).
601 Pulley (6).
600-2 Keys (6).
606 Studs and Nuts for Hub (6).
607 Bolts for Rim (6).
461 Coupling Bolt (6).

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

IGNITERS



*76x	Dial Gas Cock, complete (11).
76	Dial Gas Cock only (11).
76a	Cock Handle (11).
76b	Gas Cock Dial (11).
*78	Igniter Burner (mixer and point) (1).
*79	Igniter Bushing for End of Cyl. (1).
*79a	Igniter Bushing for Top of Cyl. (1).
*79e	Igniter Bushing Yoke Clamp (1).
79i	Indicator Hole Plug (x).
*79k	Clamp for Top of Cylinder (8).
79r	Igniter Case Clamp Stud and Nut (1)
*79z	Igniter Bushing for leaky Indicator Hole (8).
*80	Igniter Case (1).
*80a	Asbestos Liner —flat (1).
*80b	Asbestos Liner —Tube shape (1).
*80c	Mixer for Igniter Burner (1)
80d	Igniter Case Screw (1).
*81	Point for Igniter Burner (1).
*82	Needle Valve (1).
*84	Igniter Tube—Composition 6"
*84a	Igniter Tube—Composition 5"
84b	Igniter Tube—Composition 4".
*84c	1¼" Igniter Hole Plug.
84d	Igniter Tube—Composition 7".

RELEASE VALVE

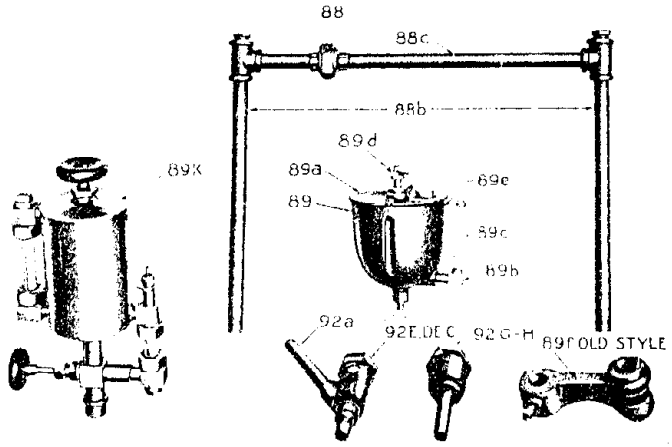
480	Release Valve Complete (1).
481	Release Valve Body (1).
*482	Release Valve Valve (1).
*483	Release Valve Lock Handle (1).

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

LUBRICATORS



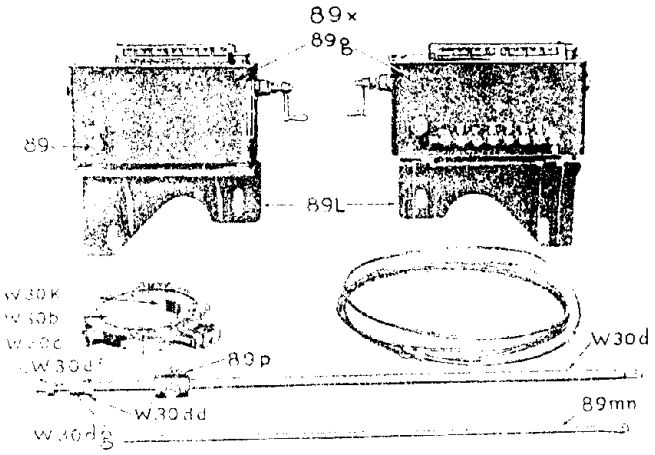
*88	Frame for Lubricator (5).
88a	Oil Wiper for Lubricator Frame (2).
*88b	Vertical Nipple for Lubricator Frame (3).
*88c	Long Horizontal Nipple for Lubricator Frame (3).
*89	Lubricator (1).
*89a	Lubricator Cover (1).
*89b	Lubricator Sight Feed Gage (1).
*89c	Lubricator Sight Feed Glass (1).
*89d	Lubricator Center (1).
89dd	Lock Nuts for Lubricator Center (1).
*89e	Lubricator Bowl (1).
*89f	Lubricator Bracket for Ring Oiler (1).
89fa	Lubricator Bracket for Ring Oiler, New Style (1).
*89k	Brass Lubricator for 40 HP. only.
*92	Lubricator Base (1).
*92a	Lubricator Base Nipple, 25-30-40 HP.
93	Oiler Bracket for side of Cylinder (1).
93a	Nipple for Cylinder side Oiler (1).

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

OLD STYLE FORCE FEED OILERS



*89x Force Feed Oiler complete (10).
89ac Tube Clips (1).
*89l Force Feed Oiler Bracket (10).
89n Force Feed Oiler Rod (used when Wico is not used) (10).
*89mn Force Feed Oiler Link (used with Wico) (10).
89md Force Feed Oiler Link Screw (1).
*89o Rocker Arm for Force Feed Oiler (12).
*89p Link Arm (for connecting Force Feed Oiler Link to Wico Rod) (1).
*89q Force Feed Oiler only (Illustrated as 89g) (10).
89r Oil Pipe to cut-off wheel side of Main Cylinder.
89rx Set Oil Pipes.
*W30bc Eccentric Hub and Yoke (5).
89s Oil Pipe to top of Cylinder.
89t Oil Pipe to Air Cylinder.
89u Oil Pipe to Pin Wheel side of Main Cylinder.
89v Oil Pipe to Centrifugal Oiler for Side Wrist Pin.
89w Oil Pipe to Ring Oiler.
89rv Oil Pipe to Ring Oiler for Crank Pin.
89ar Oil Pipe to Journal Bearing, Pin-Wheel Side.
89as Oil Pipe to Piston Pin Wiper.
89at Oil Pipe to Journal Bearing, Cut-Off Wheel Side.
89aw Oil Pipe to Wico Eccentric Oiler Bracket.
89av Oil Pipe to Outerbearing.
89y Plain Connection for Oil Pipe.
89ya Plain Ell Connection.
89z Ball Connection for Oil Pipe.
89za Ball Check Ell Connection.

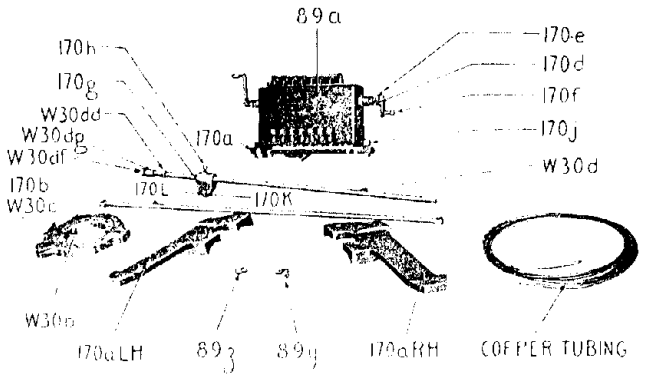
For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

NEW STYLE FORCE FEED OILER PARTS

170 FORCE FEED OILER COMPLETE



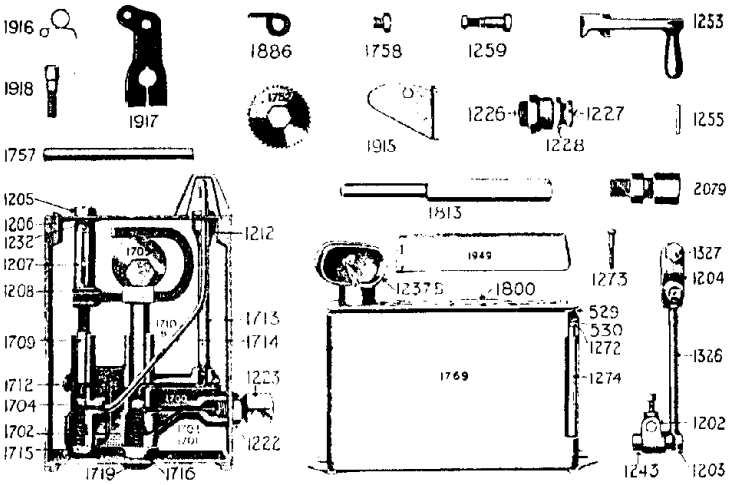
170x	New Style Force Feed Oiler complete with Eccentric and Rod (10)	*170g	Force Feed Oiler Link Arm (1).
170	New Style Force Feed Oiler complete for engines equipped with Wico Ignition (10).	*170j	Link Arm Bolt and Lock Washer (1).
		170k	Link Arm Cotter Pin (1).
*170a	Force Feed Oiler Bracket (10).	170L	Link Arm Pin (1).
*170b	Force Feed Oiler Link (10).	*170e	Set Screw for 170d (1).
170c	Force Feed Oiler Rod (10).	*170h	Set Screw for 170g (1).
*170d	Force Feed Oiler Rocker Arm (1).	170q	New Style, Line Drive, Force Feed Oiler only (10).
*170f	Force Feed Oiler Rocker Arm Washer (1).	389md	Link Arm Pin (1).

Oil Pipes, etc., are same as on Old Style Force Feed Oiler on Page 59.

For key to symbol numbers (0) after each part, see Page 30

See Index Page 3.

MANZEL FORCE FEED OILER PARTS



74	Pawl Plunger.
529	Gauge Glass Cap Plug.
530	Gauge Glass Plug.
1202	Adjustable Engine Connection.
1203	Adjustable Connection.
1204	Outside Rocker Arm.
1205	Regulating Key Head.
1206	Lock Spring.
1207	Regulating Key Fork.
1208	Regulating Spool.
1212	Drip Cup.
1222	Cylinder Lock Nut.
1223	Cylinder Reducer.
1226	Stuffing Box.
1227	Stuffing Box Gland.
1228	Stuffing Box Locknut.
1232	Regulating Key Stem.
1237	Filling Cup Cover.
1243	Adj. Connection Pin.
1253	Hand Crank.
1255	Hand Crank Pin.
1259	Pawl Pin.
1260	Pawl.
1261	Pawl Spring.
1272	Gauge Glass Washer.
1273	Sight Glass Cover Screw.
1274	Gauge Glass.
1326	Drive Rod.
1327	Rocker Arm Screw.
1700	Cylinder.
1701	Large Piston Valve Spring.
1702	Small Piston Valve Spring
1703	Large Piston Valve.
1704	Small Piston Valve.
1705	Eccentric.
1709	Regulating Plunger.
1710-B	Crosshead and Plunger.
1712	Plug Screw.
1713	Drip Cup Tube.
1714	Sight Feed Tube.
1715	Cylinder Plug.
1716	Cylinder Fastening Plug.
1719	Cylinder Fastening Screw Nut.
1752	Ratchet Wheel.
1757	Ratchet Shaft.
1758	Brake Pawl Spring Bolt.
1759	Brake Pawl Spring.
1761	Brake Pawl Pin.
1762	Brake.
1763	Inside Rocker Arm.

See Index Page 3.

MANZEL FORCE FEED OILER PARTS (Continued)

1769 Reservoir 1½ pint, 1 feed.
" 3 pint, 1 feed.
" 3 pint, 2 feed.
" 2 quart, 1 feed.
" 2 quart, 2 feed.
" 2 quart, 3 feed.
" 2 quart, 4 feed.

1800 Reservoir Cover (including filling cup and cover) 1½ pint, 1 feed.
" " 3 pint, 1 feed.
" " 3 pint, 2 feed.
" " 2 quart, 1 feed.
" " 2 quart, 2 feed.
" " 2 quart, 3 feed.
" " 2 quart, 4 feed.

1813 Eccentric Shaft 1½ pint, 1 feed.
" " 3 pint, 1, 2 feed.
" " 2 quart, 1 to 4 feeds.
" " 3 quart, 1 to 8 feeds.

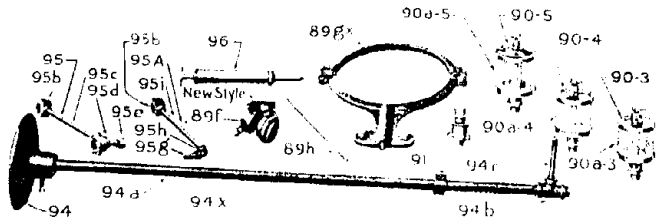
1886 Pawl—Torsion Spring Style.
1915 Brake—Torsion Spring Style.
1916 Torsion Pawl Spring.
1917 Inside Rocker Arm Torsion Spring Style.
1918 Inside Rocker Arm Screw.
1949 Moulded Glass Sight Feed Cover. (Interchangeable with Metal Cover).
1 Feed, No. 1, 2 in. long.
2 Feed, 3 Pint, No. 2, 3 in. long.
2 Feed, all larger sizes, No. 3, 4 in. long
3 Feed, 2 quart, No. 3, 4 in. long.
3 Feed, all larger sizes, No. 5, 6 in. long
4 Feed, 2 quart, No. 4, 5 in. long.
5 Feed, No. 5, 6 in. long.
6 Feed, 3 quart, No. 6, 7 in. long.
6 Feed, larger sizes (2) No. 5, 6 in. long
7 Feed, No. 7, 8 in. long.
8 Feed, No. 8, 9 in. long.

1982 Spring for Tee Check Valve.
1984 Check Valve Reducer.
1987 Ball Guide for Tee Check Valve.
1988 Cap for Tee Check Valve.
1989 ¼" Check Valve (furnished instead of 2013-B).
2013-B ¼" Check Valve (See 1989).
2033 Union Swivel Nut (⅛ in. Pipe).
2034 Union Swivel for (⅛ in. Pipe). Pumping Unit Complete.

NOTE To avoid errors in filling orders for parts, be sure to give serial number and class of pump for which parts are wanted. The number as well as the class letters will be found on the name plate.

See Index Page 3.

OILERS



*89gx	Crank Pin Oiler Ring Split (13).
89gg	Cap Screws for Ring Oiler (1).
*89h	Oil Pipe for Ring Oilers (1).
*90	Sight Feed Oilers, Nos. 2, 3, 4, 5 and 6.
*90a	Sight Feed Oiler Glasses Nos. 2, 3, 4, 5 and 6.
90b	Sight Feed Oiler Gasket.
90d	Oilers with Ball Check No. 4.
	State make and number stamped on Oiler.
*91	Side Rod Oil Cup (1).
*94x	Centrifugal Oiler Stand complete (7).
*94	Base for Centrifugal Oiler Stand (1).
*94a	Upright or Leg for Centrifugal Oiler Stand (7).
*94b	Tee for Centrifugal Oiler Stand (1).
*94c	Pipe for Centrifugal Oiler Stand (1).
*95	Centrifugal Oiler complete, New Style (7).
*95a	Centrifugal Oiler complete, Old Style (7).
*95b	Centrifugal Oiler Head (1).
*95c	Pipe for Centrifugal Oiler, New Style (7).
*95d	Centrifugal Oiler Body (1).
*95e	Cap Screw for Centrifugal Oiler (1).
*95g	Close Nipple for Centrifugal Oiler (1)
*95h	Ell for Centrifugal Oiler (1).
*95i	Pipe for Centrifugal Oiler, Old Style (7).
*96	Oil Gun (1).

OIL SAVERS FOR OUTERBEARING AND BED CAPS

One right hand and one left hand oil saver is used on each bed cap and on each outerbearing cap.

The right hand oil saver is the one to the observer's right when he stands at the end of the engine nearest the crank and faces the cylinder.

280	Oil Saver complete (1).
280a	Slide (1).
280b	Spring (1).
280c	Pin (1).
280d	Machine Screw (1).

Oil Savers are not used now on new engines, their place being taken by No. 9c Centrifugal Oil Saving Rings. Be sure to determine whether your engine is equipped with Oil Savers or Centrifugal Oil Saving Rings.

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

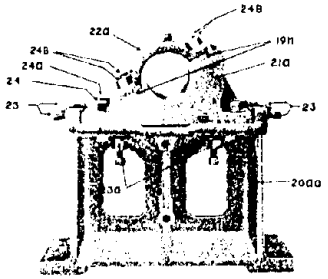
See Index Page 3.

OUTERBEARING

See Plates on Pages 38 and 64.

9c Centrifugal Oil Retaining Ring (5).
*19 Outerbearing, not Pedestal Type (4).
*19a Outerbearing, Pedestal Type (4) (See Note).
19s Ring for Outerbearing.
19ss Ladder Chain for Outerbearing.
19w Wood Liners for Outerbearing (4).
20 Outerbearing Base Plate (4).
*20a Outerbearing Pedestal only (4) (See Note).
*21 Outerbearing Box Bottom (4).
*22 Outerbearing Box Cap (4).
*23 Outerbearing Adjusting Screw (2).
23a Set Screw and Lock Nut (1).
*24 Bolt for Outerbearing, Bracket Side (1)
*24a Bolt for Outerbearing, Plain Side (1).
*24b Bolt for Outerbearing Cap (1)

INCLINED OUTERBEARING PARTS



*19aa Inclined Outerbearing Pedestal Type (4).
19b Outerbearing, not Pedestal Type, Inclined (4).
*20aa Inclined Outerbearing Pedestal (4).
*21a Inclined Outerbearing Box Bottom (4).
*22a Inclined Outerbearing Box Cap (4).

NOTE—Outerbearing Box Bottoms and Outerbearing Box Caps when furnished separate are not babbitted due to the difficulty of securing a proper fit. If babbitted bearings are wanted, both the Bottom and the Cap must be ordered.

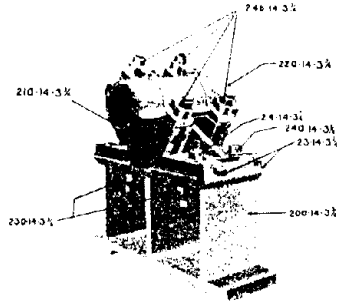
NOTE—When ordering Pedestal—consult Chart of Reverse Rigs on Page 37. Specify Rig by No. if possible, otherwise give Rig sizes.

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

14" INCLINED OUTERBEARING PARTS



9c	Oil Retaining Ring.	24	Bolts for Outerbearing (Bracket Side) (Bearing to Pedestal).
14c	Set Collar.	24a	Bolt for Outerbearing (Plain Side).
20ATN	Outerbearing Pedestal (See Note).	24b	Bolts for Outerbearing Cap ($3\frac{1}{4}$"-$4\frac{1}{4}$" only).
21A-14	Outerbearing Bottom.	24c	Studs for Outerbearing Cap (5"only)
22A-14	Outerbearing Cap.		
23	Adjusting Screws.		
23a	Set Screws with Locknut.		

NOTE:

20ATN --$4\frac{1}{4}$" Pedestal is used on all $4\frac{1}{4}$" Cut-off Rigs having either 14" Babbitt or Timken Bearings.

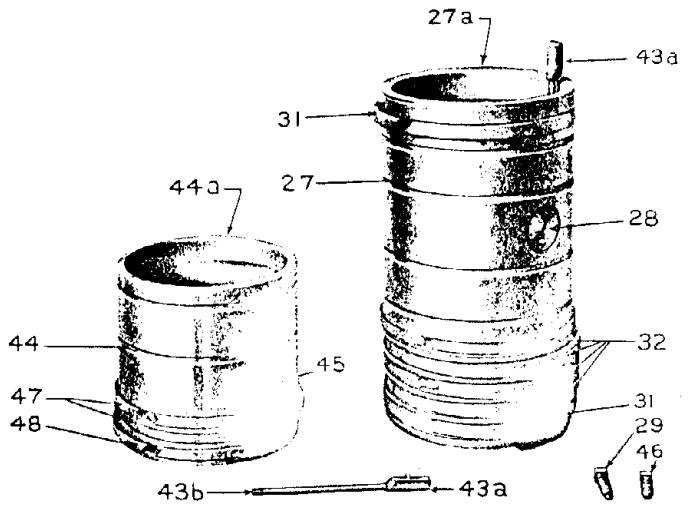
20ATN --5" Pedestal is used on all 5" Cut-off Rigs having Timken Bearings.

20AN---5" Pedestal is used on all 5" Cut-off Rigs having 14" Babbitt Bearings.

20 IST---$4\frac{1}{4}$" Pedestal is used only when Cut-off Rigs with 14" or Timken Bearings is to be placed on Old Style Foundation.

20AN-14--$3\frac{3}{4}$" Pedestal is used on all $3\frac{3}{4}$" Cut-off Rigs with 14" Babbitt Bearings.

PISTON PARTS



*27 Main Piston only (4).
*27a Main Piston with Rings and Pins (4).
27b Nipple for oil in Pistons (4).
*28 Main Piston Pin (4).
*29 Main Piston Pin Set Screw (4).
*31 Bevel Ring for Main Piston (8).
*32 Pin Ring for Main Piston (4).
*43a Wiper for Main Piston Pin (8).
*43b Nipple for No. 43a (8).
*44 Air or Charging Piston only (4).
*44a Air or Charging Piston with Rings and Pin (4).
*45 Air or Charging Piston Pin (4).
*46 Air or Charging Piston Pin Set Screw(4)
*47 Pin Ring for Air or Charging Piston (4).
*48 Bevel Ring for Air or Charging Piston (4).

PULLEYS

See Foot Note

Regular or Sistersville

12x12x16, 16x12x16, 18x12x16, 20x12x16, 24x12x16, 28x12x16, 12x14x20, 16x14x20, 18x14x20, 20x14x20, 22x14x20, 24x14x20, 26x14x20, 28x14x20, 30x14x20, 16x16x24, 18x16x24, 20x16x24, 22x16x24, 24x16x24, 28x16x24, 30x16x24, 36x16x24, 40x16x24, 48x16x24, 60x16x24, 16x18x20, 18x18x20, 20x18x20, 24x18x20, 28x18x20, 36x18x24, 16x20x24, 18x20x24, 20x20x24, 24x20x24, 28x20x24, 36x20x24, 60x20x24.

Reverse Pulleys (20" Friction)—

12x14x20, 14x14x20, 16x14x20, 18x14x20, 20x14x20, 22x14x20, 24x14x20, 16x18x20, 20x18x20, 24x18x20, 22x18x20, 14x18x20.

Reverse (24" Friction)—

16x14x24, 18x14x24, 20x14x24, 24x14x24, 14x16x24, 16x16x24, 18x16x24, 20x16x24, 24x16x24, 26x16x24, 30x16x24, 14x18x24, 16x18x24, 18x18x24, 20x18x24, 22x18x24, 24x18x24, 26x18x24, 14x20x24, 16x20x24, 18x20x24, 20x20x24, 22x20x24, 24x20x24.

NOTE—The first number indicates the diameter; the second number indicates the width of face, the third number indicates the friction.

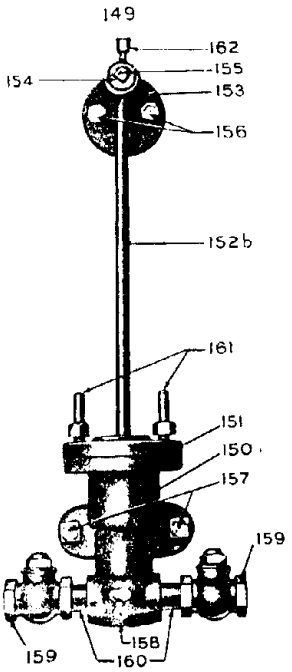
*Illustrated.

For key to symbol numbers (0) after each part, see Page 30.

See Index Page 3.

PLUNGER TYPE WATER PUMPS

Two Sizes—2" and 3"



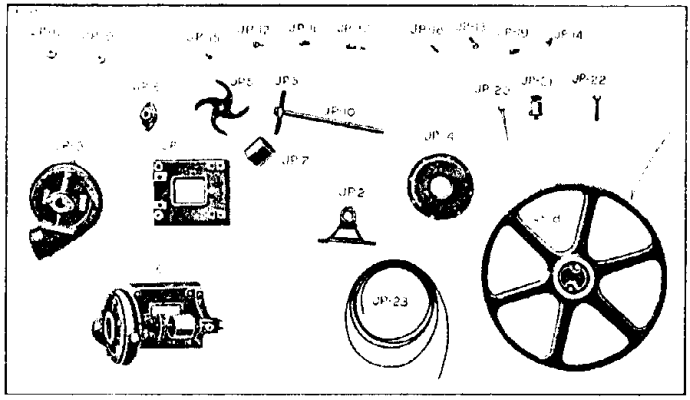
*149	Plunger Type Pump complete 2" and 3".
*150	Pump Barrel 2" and 3".
*151	Pump Gland 2" and 3".
152	Plunger and Rod 2" and 3".
152a	Pump Plunger 2" and 3".
*152b	Pump Rod 2" and 3".
152c	Pump Plunger Pin 2" and 3".
*153	Pump Crank—Show for what size shaft (4).
*154	Washer for Pump Crank Pin (1).
*155	Cap Screw for Crank Pin (1).
*156	Cap Screw for Shaft (1).
*157	Lag Screw (1).
*158	Pet Cock (1).
*159	Check Valve (1).
*160	Nipple (1).
*161	Pump Gland Stud and Nut (1).
*162	Pump Rod Oil Cup (1).

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

JP-1 PUMP PARTS



*JP1- 1 Base (1).
*JP1- 2 Pedestal (1).
*JP1- 3 Case (1).
*JP1- 4 Case Cover (1).
*JP1- 5 Impeller (1).
*JP1- 6 Gland (1).
*JP1- 7 Pulley for Shaft No. 10 (1).
*JP1- 8 Large Pulley for Engine Shaft (4)
*JP1- 9 Collar (1).
*JP1-10 Shaft (1).
*JP1-11 Seal (1).
*JP1-12 Stud and Nut for Case (1).
*JP1-13 Bolt for Base (1).
*JP1-14 Cap Screw for Pedestal (1).
*JP1-15 ¼" Plug for Case (1).
*JP1-16 ⅜" Plug for Case (1).
JP1-17 Bolt and Nut for Gland (1).
*JP1-18 Set Screw for Collar (1).
*JP1-19 Set Screw for Pulley (1).
*JP1-20 Lag Screw for Foundation (1).
*JP1-21 Oil Cup (1).
*JP1-22 Bolt for Large Pulley No. 8 (1).
*JP1-23 12 ft. Belt for Pump (1).
JP1-24 Pump complete with Pulley less Belt (1).
JP1-25 Pump complete with Pulley and Belt (1).
*JP1-26 Pump complete less Pulley and Belt (1).
JP1-27 Pin through Impeller Shaft (1).
JP1-28 Woodruff Key No. 5 (1).
JP1-30 Split Pulley for Twin Engines (4).
JP1-31 Double Face Pulley (4).
JP1-32 Split Pulley for Twin Rig (1).
JP1-33 Pulley, to Key on Shaft (1).
JP1-34 Sub for Pulley (1).
In ordering JP1-8, JP1-24, JP1-25, JP1-30 and JP1-31, always state for what size shaft.

This is a small pump designed to be used to circulate the water through the water jacket of the gas engine cylinder.

The inlet and outlet are for 2" pipe and 2" pipe should be used whenever possible as reducing the size of the pipes greatly reduces the quantity of the water that can be put through them.

The pump must be placed in the line to take the water from the tank and deliver it to the gas engine, and through the gas engine water jacket back into the tank.

A 20" pulley that bolts on to the end of the engine crank shaft is furnished to drive the pump.

On Twin Engines, a split pulley, JP 30, is used to drive the pump. It is located between the drive pulley and outerbearing.

This pump is not intended to be used as either a suction or pressure pump. It should be so set to allow the water to run into it and the highest point of the discharge pipe should not be more than 5 feet above the water level in the tank.

Under proper conditions this pump will be found very efficient in handling a large quantity of water and giving it active circulation through the engine cylinder.

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

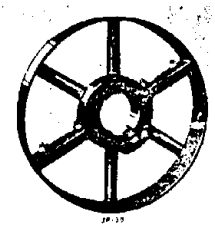
See Index Page 3.

JP-C BALL BEARING PUMP PARTS

JPC 1 Base.
JPC 3 Case.
JPI 5 Impeller.
JPC 6 Gland.
JPI 7 2½" Pulley for Shaft No. 10.
JPI 7 4" Pulley for Shaft No. 10.
JPI 8 Shaft Pulley, 20" Diameter.
JPC 9 Collar.
JPC 10 Shaft.
JPI 11 Seal.
JPI 12 Stud and Nut for Case.
JPI 15 ¼" Plug for Case.
JPI 16 ⅛" Plug for Case.
JPI 17 Stud and Nut for Gland.
JPI 18 Set Screw for Collar.
JPI 19 Set Screw for Pulley.
JPI 20 Lag Screw for Foundation.
JPI 21 Oil Cup.
JPI 22 Bolt for Shaft Pulley No. 8.
JPI 23 12 ft. Belt for Pump.
JPC 24 Pump complete with Shaft Pulley less Belt.
JPC 25 Pump complete with Shaft Pulley and Belt.
JPC 26 Pump complete less Shaft Pulley and Belt.
JPI 27 Impeller Pin.
JPI 28 Woodruff Key.
JPC 30a Key ⅜" x 1" x 3".
JPC 40 Outside Bearing Cap.
JPC 41 Inside Bearing Cap.
JPC 43 Ball Bearing.
JPC 44 Bearing Bolt ⅜" x 2".

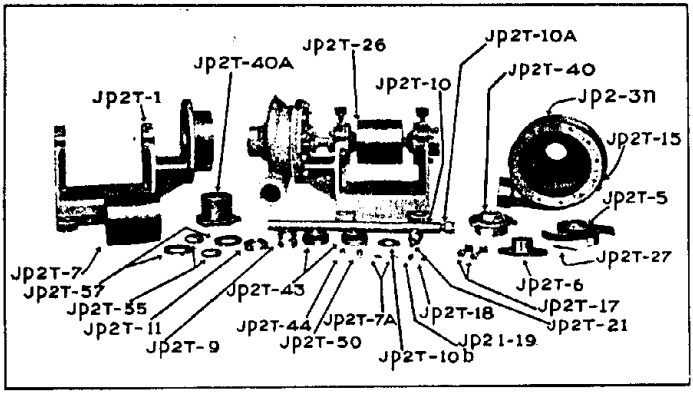
JP-3 PUMP PARTS

JP3-1	Base.
JP2-3n	Case.
JP2T-5	Impeller.
JP2T-6	Gland.
JP3-7	Pump Pulley.
JP3-7d	Pump Pulley.
JP3-7g	Pump Pulley.
JP2T-7a	Key for Pulley.
JP2T-9	Set Collar.
JP3-10	Pump Shaft.
JP2T-10a	Nut for Shaft.
JP2T-10b	Washer.
JP2T-11	Water Seal.
JP2T-17	Gland Bolts.
JP2T-23	Belt for Pump—12 ft.
JP3-24	Pump complete less Belt.
JP3-25	Pump complete with Belt and Shaft Pulley.
JP3-26	Pump complete less Belt and Shaft Pulley.
JP3-26a	Pump complete with Belt less Shaft Pulley.
JP2T-27	Impeller Pin.
JP2T-40	Bearing Case.
JP2T-40a	Bearing Case.
JP2T-50	Cap Screws for Case (⅜"x1")
JP2T-52	Pipe Plug (¼").
JP2T-53	Pivot Point Set Screw (½" x 13-16").
JP2T-54	Gasket for Case.
JP2T-55	Packing for Case.
JP2T-{14120 / 14273}	Timken Bearing.



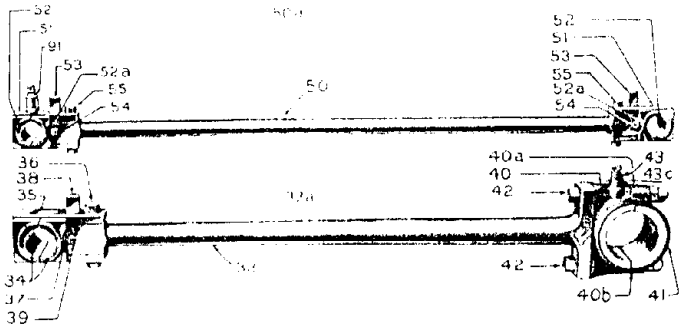
JP 30 Split Pulley for Twin Engines.

JP-2T PUMP PARTS



P2T-1	Base.
P2-3n	Case.
P2T-5	Impeller.
P2T-6	Gland.
P2T-7	Pump Pulley.
P2T-7a	Key for Pump Pulley.
P2T-9	Set Collar.
P2T-10	Pump Shaft.
P2T-10a	Nut for Shaft.
P2T-10b	Washer.
P2T-11	Water Seal.
P2T-17	Gland Bolts.
P2T-18	Set Screws.
P2T-19	Set Screws.
P2T-21	Grease Cup.
P2T-23	Belt for Pump—12 ft.
P2T-24	Pump complete less Belt.
P2T-25	Pump complete with Belt and Shaft Pulley
JP2T-26	Pump complete less Belt and Shaft Pulley.
JP2T-26a	Pump complete with Belt less Shaft Pulley.
JP2T-27	Impeller Pin.
JP2T-40	Bearing Case.
JP2T-40a	Bearing Case.
JP2T-50	Cap Screws for Case (3/8"x1").
JP2T-51	Cap Screws for Bearing Case (3/8"x1 3/4").
JP2T-52	Pipe Plugs (1/4").
JP2T-53	Pivot Point Set Screws (1/2" x 13/16").
JP2T-54	Gasket for Case.
JP2T-55	Packing for Case.
JP2T { 14120 / 14273 }	Timken Bearings.

MAIN RODS



*33 Main Rod Body only (5).
*33a Main Rod complete (5).
*34 Main Rod Brasses (5).
*35 Main Rod Strap (14).
*36 Bolt for Main Rod Strap (14).
*37 Liner for Main Rod Brasses (14).
*38 Key for Main Rod (14).
*39 Set Screw for Main Rod (1).
*40 Body for Main Rod Head (11).
*40a Main Rod Head complete, no Bolts (11).
40ax Bronze Main Rod Head complete, no Bolts (11).
*40b Compression Liner (11).
*41 Cap for Main Rod Head (11).
*42 Bolt for Main Rod Head (3).
42a Nuts for No. 42 (2).
*43 Oil Wiper for Main Rod Head (15)
*43a Wiper for Main Piston Pin (1).
*43b Nipple for No. 43a (1).
*43c Screws for Oil Wiper (1).
43d Covers for Oil Holes (15).

SIDE RODS

For 49-49a-T49 Wrist Pins, See Wheels

*50 Side Rod Body only (4).
*50a Side Rod complete (4)
*51 Side Rod Strap (11).
*52 Side Rod Brasses (11).
*52a Liner for Side Rod Brasses for 25-30-40 HP. only (16).
*53 Side Rod Key (11).
*54 Set Screw (1).
*55 Side Rod Strap Bolt (11).
*91 Oil Cup for Side Rod (1).

OIL CATCHER

Regular Equipment on 25-30-31-35 and 40 HP. Cut-off Engine.

Special Equipment on 25-30-31-35 and 40 HP. Sistersville and 25-30-31-35 and 40 HP. Reverse Engines.

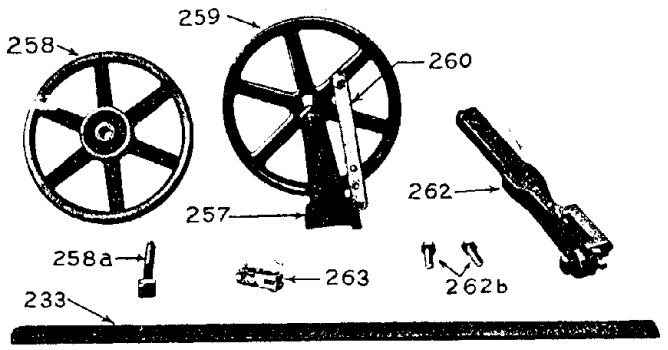
277 Oil Catcher for Side Rod complete (16)
277a Radius Casting (16).
277b Straight Casting (16).
277c Large Sheet Perforated Steel (16).
277d Machine Screws (16).
277e Brace (16).
277f Bolt $\frac{3}{8}$"x1$\frac{1}{4}$" with Spring Washer (1)
277g Bolt $\frac{3}{8}$"x1$\frac{3}{4}$" with Spring Washer (1)
277h Cap Screw (16).
277i Base (1).
277j Pipe for Base (1).
277k Latch Support (1).
277l Latch Pin (1).
277m Latch (1).
277n Latch Handle (1).
277o Door Jamb (1).
277p Door Post (16).
277q Frame for Door (16).
277r Perforated Steel for Door (16).
277s Hinges (1).
277t Flange for Top of Base Pipe (1).
277u Bolts for Flange (1).
277v Bolts for Flange (1).
278 Flywheel Oil Wiper (1).

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

SPEED REGULATORS (Speed Wheels)



*233 Lever (3).
*257 Sheave Stand (1).
257x Speed Wheel complete (3).
*258 Hand Wheel (1).
*258a Lag Screws (1).
*259 Sheave Wheel (1).
259a Cap Screw (1).
*260 Link (15).
*262 Lever Bracket (3).
*263 Lever Head Connection (1).
*262b Cap Screws (1).
282 By-Pass complete (1).
282a Globe Valve for By-Pass (1).
282b Sheave Wheel for By-Pass (1).

HEADACHE POST FITTINGS

1260 Headache Post Fittings Complete. (1)

RELIEF VALVE FOR AIR CYLINDER

See Plate on Page 73

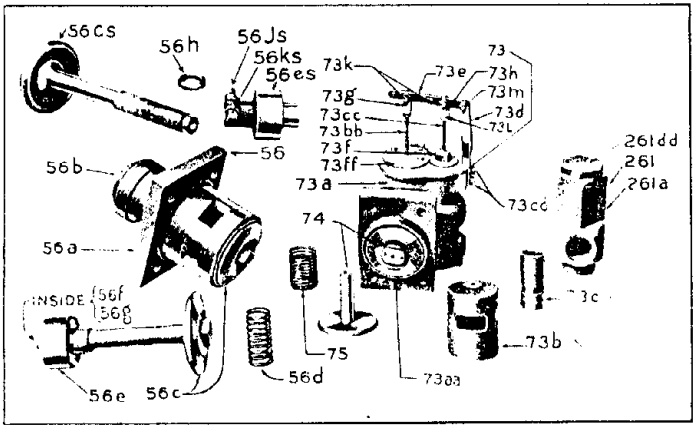
*261 Relief Valve complete (2).
*261a Relief Valve Case (2).
261b Relief Valve Valve (2).
261c Relief Valve Lock Nut (obsolete)(2).
261d Relief Valve Plug, Old Style (2).
*261dd Relief Valve Plug, New Style (2).
261e Relief Valve Spring (2).

For key to symbol numbers (0) after each part, see Page 30

*Illustrated

See Index Page 3.

MAIN VALVES



*56	Main Valve complete (3).	*56g	Pin for Main Valve (1).
*56a	Main Valve Case (3).	57	Upper Copper Gasket (3).
*56b	Main Valve Cap (15).	58	Lower Copper Gasket (3).
*56c	Valve for Main Valve (7).	97	Main Valve Wrench, Two sizes, 20 and 40 HP.
*56d	Main Valve Spring (7).		
*56e	Main Valve Plunger (3).	134	Main Valve Stud and Nut (3).
*56f	Nut for Main Valve (3).		

On December 4, 1915, valves for main valve No. 56c were changed on 25-30 and 40 HP. engines. This change did not effect 20 HP. and smaller sizes. This new style main valve is known as the X type. This change effects parts 56a case, 56c valve, 56e plunger and 56f nut. To distinguish the X type from the old style, the number on these parts has an X suffixed. All new engines of the horse powers mentioned, built since this change, have had the X type and all complete valves No. 56 shipped from our factory since that date, are of the X type. In ordering repair parts, always state whether for X type or not.

MAIN VALVES
(Split Plunger Type)

56s	Main Valve Complete (16).	56h	Main Valve Lock Ring (16).
56a	Main Valve Case (16).	56j	Lock Screw for Plunger (16).
56bs	Main Valve Cap (16).	56k	Stop Nut for Lock Screw (1).
56cs	Valve for Main Valve (16).	57	Upper Copper Gasket (16).
56d	Main Valve Spring (16).	58	Lower Copper Gasket (16).
56es	Main Valve Plunger (16).	134	Main Valve Stud and Nut (16).

FUEL VALVES

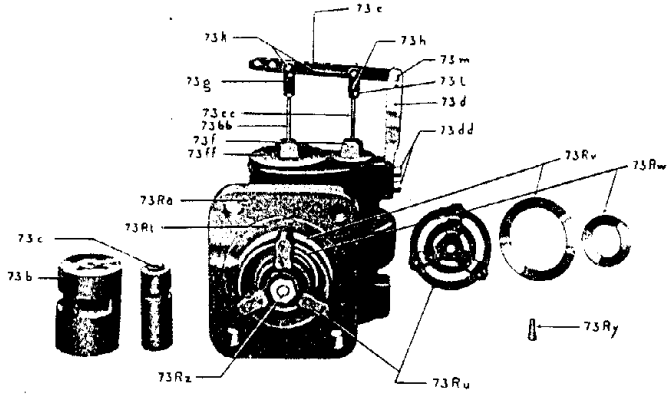
*73	Fuel Valve complete (3).	*73ff	C-I Bushing for Air Valve (3).
*73a	Case of Fuel Valve (3).	73ffg	Stationary Air Valve Bushing.
*73aa	Fuel Valve Gasket (3).	*73g	Head for Air Valve Stem (1).
*73b	Air Valve of Fuel Valve (3).	*73h	Head for Gas Valve Stem (1).
*73bb	Air Valve Stem (1).	*73k	Taper Pin No. 5 x 1" (1).
73bbs	Stationary Air Valve Stem.	*73l	Taper Pin No. 0 (1).
*73c	Gas Valve of Fuel Valve (3).	*73m	Taper Pin No. 5 x 1¼" (1).
*73cc	Gas Valve Stem (1).	73n	¼" Faced Nuts (1).
*73d	Arm of Fuel Valve (1).	73o	Arm for Stationary Air Valve.
*73dd	Fuel Valve Arm Screw (1).	*74	Fuel Check Valve (3).
*73e	Fuel Valve Cross Bar (3).	*75	Spring of Fuel Check Valve (7).
*73f	C-I Bushing for Gas Valve (3).	133	Fuel Valve Stud and Nut (3).

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

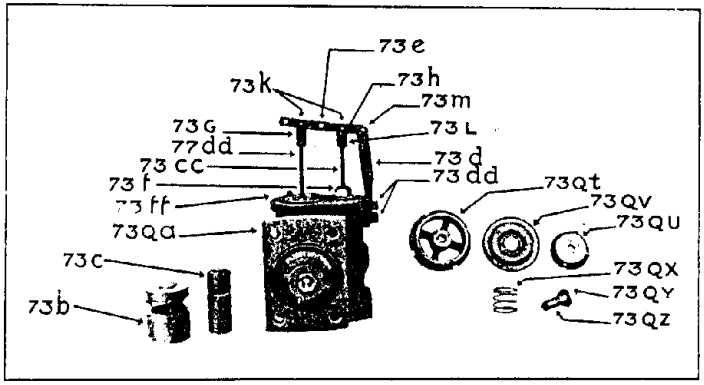
RING FUEL VALVES
(Obsolete)



73R	Ring Fuel Valve complete (3).	*73Rv	Valve for Ring Fuel Valve, large (1).
*73Ra	Case for Ring Fuel Valve (3).	*73Ry	Spring for Ring Fuel Valve (1).
*73Rt	Cage for Ring Fuel Valve (3).	*73Rw	Valve for Ring Fuel Valve, small (1)
*73Ru	Keeper for Ring Fuel Valve (3).	*73Rz	Stud and Nut (1).

25 and 40 HP. Ring Fuel Valve has two valves, 1-C73Rv and 1-F73Rv.
Parts not mentioned above are the same as in the regular Fuel Valve.

DURABLA FUEL VALVES



73Q	Durabla Fuel Valve, complete (3).	73Qv	Valve for Durabla Fuel Valve (3).
73Qa	Case for Durabla Fuel Valve (3).	73Qw	Ferrule for Durabla Fuel Valve (3)
73Qs	Spring for Durabla Fuel Valve (15).	73Qy	Nut for Durabla Fuel Valve (1).
73Qt	Seat for Durabla Fuel Valve (3).	73Qz	Stud for Durabla Fuel Valve (3).
73Qu	Guard for Durabla Fuel Valve (3).		

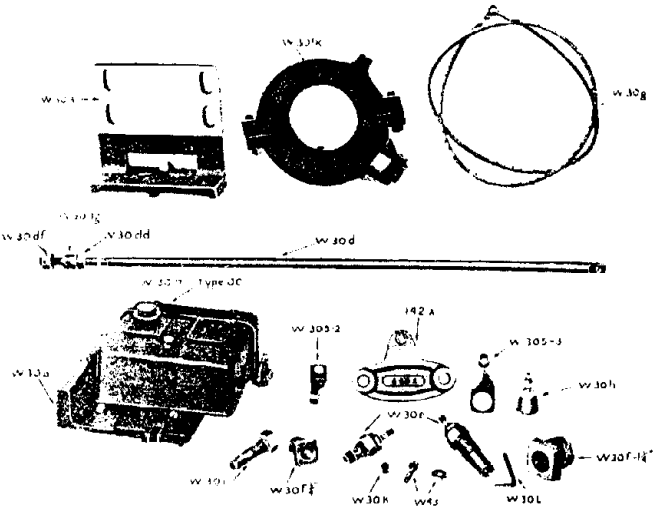
Parts not mentioned above are the same as in the regular Fuel Valve.

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

See Index Page 3.

WICO IGNITER PARTS



*W 30a Bracket for Bed (18).
W 30ob Bracket for Outerbearing (3).
*W 30bc Eccentric Hub and Yoke (5).
*W 30d Eccentric Rod (10).
*W 30dd Hex. Nut for Wico Rod (1).
*W 30df Round Nut for Wico Rod (1).
*W 30dg Sleeve for Wico Rod (1).
*W 30e Spark Plug (1).
*W 30f Spark Plug Bushing $\frac{3}{4}$"x1$\frac{1}{4}$".
*W 30g Cable with Terminal (1).
W305-1 Straight Cable Support (1).
*W305-2 Bent Cable Support (1).
*W305-3 Twisted Cable Support (1).
*W 30h Oil Cup (1).
*W 30i Bolts for Bracket (1).
*W 30k Hollow Set Screw (1).
*W 30l Set Screw Wrench (1).
*W 30m Wico only (1).
W 30n Wico complete (4).
W 30p Gears for W 30y.
W 30q Brass Bearing for W 30y.
W 30r Brass Bearing for W 30y.
W 30s. Shaft for W 30y.
W 30t Screw for Eccentric Hub.
W 30x Wico Driving Apparatus complete (4).
* 142x Wico Hand Hole Plate (19).
W 30y Timing Gears for Wicos on Right Hand Engines.

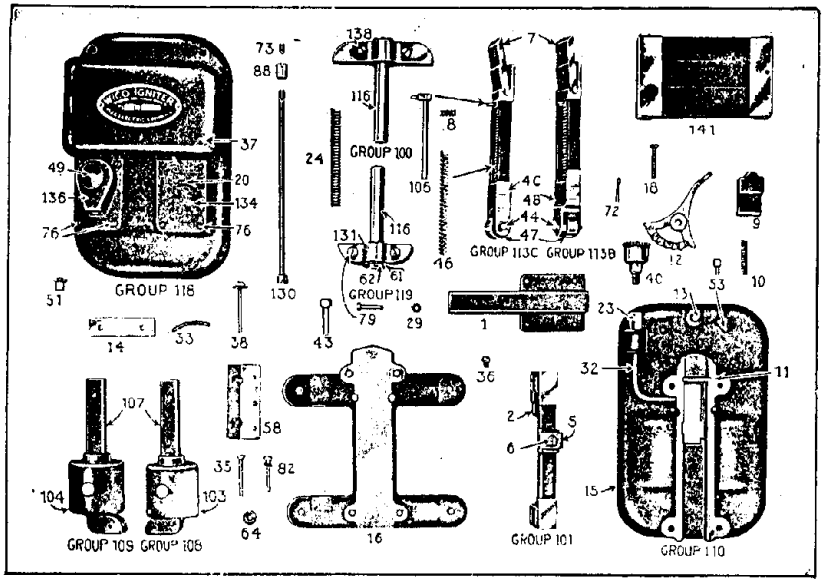
ENGINE WRENCHES

97 Main Valve Wrench.
98 No. 34, Main and Fuel Valve Nut Wrench 12-15-20 HP.
98a No. 39, Main and Fuel Valve Nut Wrench 25-30 HP.
98b No. 41, Main and Fuel Valve Nut Wrench 40 HP.
98c No. 46, Coupling Bolt and Bed Cap Nut Wrench 40 HP.
98d No. 30, Wrench for Engines with Wico.
98f Force Feed Oiler Wrench, No. 2.
99 Set Screw Wrench No. 534.
100 Socket Wrench for Clutch.
198w Socket Wrench for Reverse Rig.
275 Socket Wrench for Cut-Off Rig.

For key to symbol numbers (0) after each part, see Page 30.

*Illustrated.

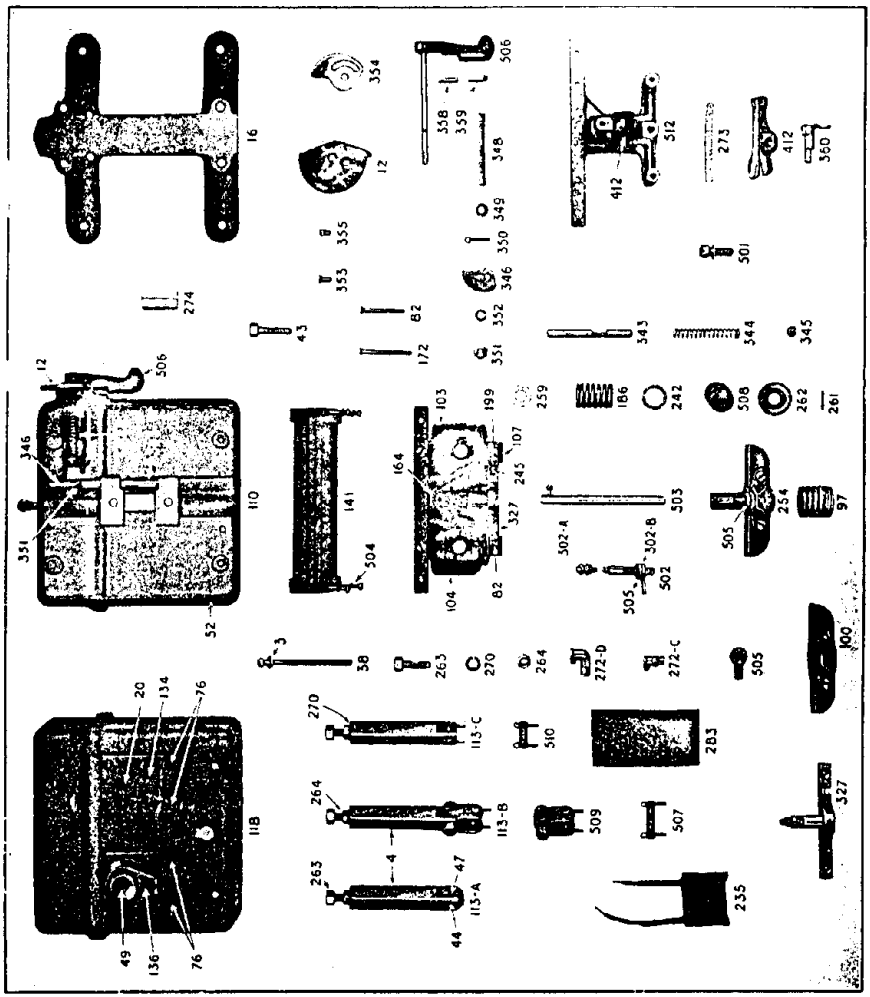
See Index Page 3.



W 1 Armature Bar Guide.
W 2 Armature Bar.
W 3 Cover Screw Washer.
W 4 Driving Bar.
W 5 Latch Block.
W 6 Latch Block Screw.
W 7 Latch.
W 8 Latch Spring.
W 9 Timing Wedge.
W 10 Timing Wedge Spring.
W 11 Timing Wedge Spring Stop.
W 12 Timing Quadrant.
W 13 Timing Quadrant Pin.
W 14 Pole Piece Base.
W 16 Back Plate.
W 17 Magnet.
W 18 Magnet Screw (small).
W 23 Grease Cup Extension.
W 24 Armature Spring.
W 29 Armature Bolt Nut.
W 32 Grease Tub.
W 33 Coil Connecting Wire.
W 35 Pole Piece Screw.
W 36 Armature Bar Guide Screw.
W 37 Cover.
W 38 Cover Screw.
W 40 Grease Cup.
W 43 Backplate Screw.
W 44 Driving Bar Roller Pin.
W 46 Driving Bar Spring.
W 47 Driving Bar Roller.
W 49 Lead Wire Connecting Plug.
W 52 Gasket for Cover.
W 53 Armature Guide Button.
W 58 Pole Piece.
W 61 Arm. Stud Fibre Washer.
W 62 Arm. Stud Steel Washer.
W 63 Driving Bar Spring Guide Rod.
W 64 Core Washer.
W 68 Driving Bar Spring Guide Head.
W 72 Cotter Pin.
W 73 Locking Screw. Arm. Ret. Rod.
W 76 Terminal and Ground Plate Screw.
W 79 Armature Bolt.
W 81 Core Screw Lock Washer.
W 82 Core Screw.
W 88 Nut for Arm. Retaining Rod.
W 89 Magnet Clamp.
W 100 Armature Group (long) complete.
W 101 Armature Bar Group.
W 102 Armature and Arm. Bar Group.
W 103 Coil Group, right hand.
W 104 Coil Group, left hand.
W 106 Driving Bar Spring Guide Rod Group
W 107 Core Group.
W 108 Coil and Core Group, right hand.
W 109 Coil and Core Group, left hand.
W 110 Case Group.
W 113 Driving Bar Group (specify B or C Bar).
W 116 Armature Stud Group.
W 118 Cover Group.
W 119 Armature Group (short) complete.
W 130 Armature Retaining Rod Group.
W 131 Armature Plate Group (short).
W 134 Ground Plate Group.
W 136 Terminal Plate Group, complete.
W 138 Armature Plate Group (long).
W 141 Magnet Group.
Lead Wire.
Keeper.
Lead Wire Gland.
Terminal Tips.
Keeper for Magnet Group.

See Index Page 3.

PARTS WICO TYPE "O.C." MAGNETO



See Index Page 3.

LIST OF PARTS WICO TYPE "OC" MAGNETO

Do Not Fail to Specify Type "OC" Magneto

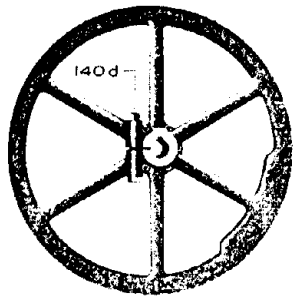
Part No.	Name
OC 3	Cover Screw Washer.
OC 4	Driving Bar.
OC 12	Timing Quadrant.
OC 16B	Backplate—(Height 11-16").
OC 16C	Backplate—(Height 11_{16}").
OC 20	Ground Screw.
OC 38	Cover Screw, with Lead Washer.
OC 43	Backplate Screw.
OC 44	Driving Bar Roller Pin.
OC 47	Driving Bar Roller.
OC 49	Lead Wire Connection Plug.
OC 52	Gasket.
OC 76	Screw for Terminal and Ground Plates.
OC 82	Core Screw.
OC 97	Armature Return Spring.
OC100	Armature & Armature Bush. Group
OC103	Coil.
OC104	Coil.
OC107	Core Group.
OC110	Case Group.
OC113A	Driving Bar Group, with Roller.
OC113B	Driving Bar Group, with Adaptor.
OC113C	Driving Bar Group, without Roller.
OC118B	Cover Group, without Oiler.
OC118C	Cover Group, with Oiler.
OC134	Ground Plate Group.
OC136	Terminal Plate Group.
OC141	Magnet Group.
OC164	Condenser Support.
OC172	Pole Yoke Screw Long.
OC186	Drive Spring.
OC199	Ground Connection Screw.
OC235	Condenser.
OC239	Coil Wedge.
OC241	Coil Group (103 and 104 with connections).
OC242	Drive Spring Adjusting Washer.
OC245	Ground Lead Clamp.
OC254	Armature Tube Group.
OC259	Drive Spring Washer.
OC261	Armature Retaining Pin

Part No.	Name
OC262	Armature Retaining Washer.
OC263	Overtravel Adjusting Screw.
OC264	Overtravel Adjusting Screw Nut.
OC270	Overtravel Adjusting Screw Lock Washer.
OC272C	Straight Oiler.
OC272D	Elbow Oiler.
OC273	Rocker Arm Lubricating Pad.
OC274	Driving Bar Lubricating Pad.
OC283	Oil Shield.
OC302A	Breaker Point Nut.
OC302B	Breaker Point Nut.
OC327	Core Bracket Group.
OC343	Timing Rod.
OC344	Timing Rod Spring.
OC345	Timing Rod Retaining Screw.
OC346	Timing Cam.
OC348	Timing Cam Shaft Spring.
OC349	Timing Cam Shaft Washer.
OC350	Timing Cam Shaft Pin.
OC351	Timing Cam Nut.
OC352	Timing Cam Lock Washer.
OC353	Timing Quadrant Screw.
OC354	Timing Lever Stop.
OC355	Timing Lever Stop Screw.
OC358	Timing Lever Friction Pin.
OC359	Timing Lever Friction Pin Spring.
OC360	Rocker Arm Pin Group.
OC412	Rocker Arm Group.
OC501	Assembly Plate Screw and Lock Washer.
OC502	Breaker Point Set.
OC503	Guide Rod Group.
OC504	Magnet Screw with Lock Washer.
OC505	Breaker Point Lubricating Felts.
OC506	Timing Cam Shaft Group.
OC507	Adaptor Pin with Cotter Pins.
OC508	Armature Return Spring Pads (3).
OC509	Adaptor Group.
OC510	Driving Bar Pin.
OC511	Set of Coil Connecting Wires.
OC512	Assembly Plate Group.

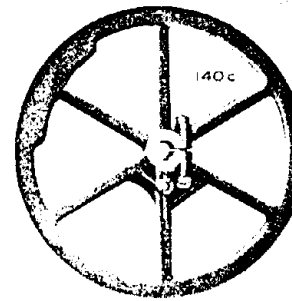
See Index Page 3.

WHEELS

Cut Off Wheel With Split Hub, No. 7s.

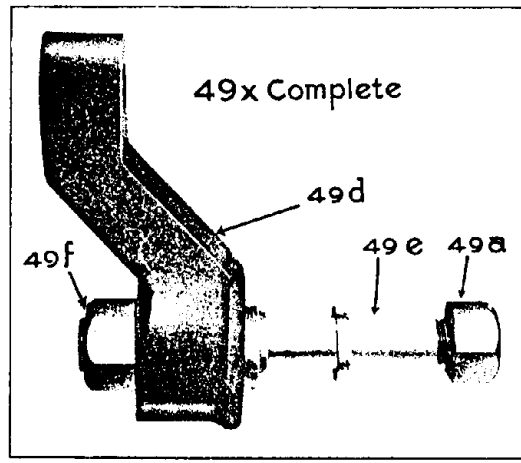


Pin Wheel With Split Hub, No. 5s



5 Pin Wheel (5).
*5s Pin Wheel with Split Hub (5).
6 Plain Wheel (5).
7 Cut-Off Wheel (5).
*7s Cut-Off Wheel with Split Hub (5).
405 Pin Wheel for Counterbalanced Crank (5).
407 Cut-Off Wheel for Counterbalanced Crank (5).
131 Key for Wheel (5).
140 Wheel Hub Bolt (5).
140a Wheel Wedge (5).
*140c Wheel Hub Stud for 5s (5).
*140d Wheel Hub Bolt for 7s (5).

WRIST PINS



49 Wrist Pin for Side Rod (11).
T-49 Wrist Pin for Measuring Line o/s (17).
49x Wrist Pin for Measuring Line Reel, Comp. (5).
49a Nut for Wrist Pin (1).
49c Key for Wrist Pin (1).
49d Arm for Wrist Pin (5).
49e Wrist Pin (5).
49f Nut for Wrist Pin (Arm End) (1).

NOTE—In ordering parts Nos. 49, 49a, T49, and T49x for 20, 25, 30 and 40 HP, always state size of wrist pin where it fits the wheel, as there are two sizes.
1 13-32" (old style) and 1¾" (new style) on 20 HP.
1¾" (old style) and 2" (new style) on 25 or 30 HP.
2" (old style) and 2¼" (new style) on 40 HP.
If order does not give this information, new style will be furnished.
*Illustrated.

See Index Page 3.