

(No. 1926A)

# Instruction Book *and* List of Parts

Models D-E-F-G-H-N and S  
Economy Gasoline Engines

*Help Us — So We Can Serve  
You Promptly*

When ordering repairs always give us the following information so we can be sure of sending you the correct parts:

**The horse-power.**

**Engine number.**

**The Model, which is the letter  
shown after the horse-power.**

You will find all of this information on the brass plate on the top of the water reservoir.

Do not send us the parts as sample. Pick out the part in the picture on pages 12 and 13, then refer to the number given on the following pages and order by the name and number of the part.

If you do not give us the information as requested above, we may have to write you for it before we can send the parts you want.

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## To Get the Engine Ready to Run

**First.** Remove the plugs from the oil holes in the main and connecting rod bearings. Fill the grease cups with the sample grease we furnish. The two big cups go on the main bearings, the small one on the governor. (The small cup for the 1½, 1¾, 2 and 2¼ horse-power engines go on the connecting rod.) Turn the tops down until the grease comes out around the bearing.

**Second.** The large automatic grease cup (Figure 1, not furnished on the 1½, 1¾, 2 and 2¼ horse-power engines) goes on the connecting rod. To fill and adjust this cup, screw the lever "A" down as far as it will go. Then unscrew the cup at "B." With a screwdriver turn the screw in the shank "C" to the right until the hole through the bottom of the cup is closed.

Fill the top part of the cup with grease. Screw the two parts together securely and turn the lever "A" to the left until it reaches the position "D." Then take the screwdriver and turn the screw "C" slowly to the left until the grease starts to come out slowly. Then screw the cup in position on the connecting rod. This cup should be readjusted for hot or cold weather.

**Third.** Pour some cylinder lubricating oil into the pipe that runs down through the water reservoir; at the same time turn the flywheels around two or three times to lubricate the piston and cylinder. Then fill the brass lubricator with oil from the sample can we furnish and screw it into the pipe. Raise the lever on the top of the lubricator straight up and adjust it to feed oil as follows:

Horse-Power	On Full Load	On Light Load
1½ to 3½	10 drops per minute	5 drops per minute
5 to 8	20 drops per minute	10 drops per minute
9 to 14	30 drops per minute	15 drops per minute

Use the best grade of medium gas engine oil and grease, like the samples we furnish. **Fourth.** Before starting the engine "OIL IT." Do not depend on the oil cups and sight feed oiler for the first oiling, but take an oil can and oil each moving part. Move the working parts with your hands. See that they move freely and that the oil is getting to the places where it is needed.

Turn the flywheels around until the piston comes out of the cylinder as far as it will come, put oil on top of the piston and on the piston pin inside the piston.

The engine is new and all parts are tight. The oil put on it at the factory may be dry and will have to be softened up before the oiling system will perform its regular duty.

**Fifth.** Fill hopper with clean water and tank with gasoline.

### CAPACITY OF GASOLINE TANKS.

The gasoline tank is located in the base and is filled through the filler pipe on the side of the engine base. The 1½ horse-power tank holds 1 gallon; 1¾, 2 and 2¼ horse-power, 1½ gallons; 3 and 3½ horse-power, 1¾ gallons; 5 and 6 horse-power, 2¾ gallons; 7 and 8 horse-power, 5¼ gallons; 9 and 10 horse-power, 7¾ gallons; 12 and 14 horse-power, 11¾ gallons.

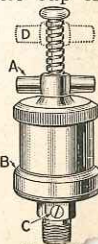


Figure 1.

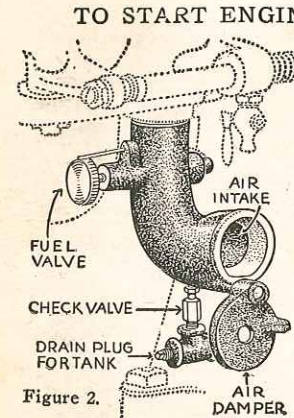


Figure 2.

**Figure 2.** Open the fuel valve on mixer two full turns to the left and turn the air damper (Figure 2) up so it closes the opening in the mixer, turn on the oil by raising the lever on the lubricator and be sure the oil is dropping properly.

**Second.** Turn the spark lever up to the starting position, as shown in Figure 4. This retards the spark and prevents the engine from kicking back when you start it.

**Third.** Turn the flywheels to the right until the detent blade (Figure 3) on the governor can be pushed in behind the catch block on the cam rod and hold it there with your left hand. Position of blade is different on 1½ horse-power, but it works the same.

**Fourth.** Place the starting crank on the shaft that extends through the flywheel on the governor side of the engine or take hold of a spoke in the wheel and turn the wheels around to the right rapidly five or six times; then let go of the detent blade, but continue to turn the flywheels until the engine starts.

Starting cranks furnished only with 1¾ to 8 horse-power engines. Starting handle is in rim of flywheel on the 1½ horse-power.

**Fifth.** As soon as engine starts, turn the air damper down to position as shown in Figure 2, push the spark lever down to the running position (Figure 4) and close the fuel valve slowly until the point is reached where the engine runs with the least number of explosions and without black smoke appearing at the exhaust or a popping sound at the mixer. A popping sound at the mouth of the mixer is caused by an insufficient supply of fuel, and smoke at the exhaust by too much fuel.

In cold weather it may be necessary to leave the air damper partially closed for a short time until the engine gets warmed up.

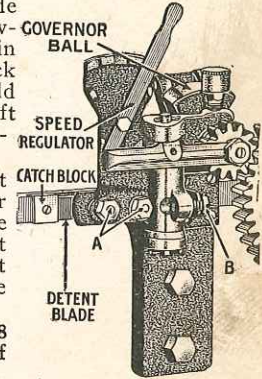


Figure 3.

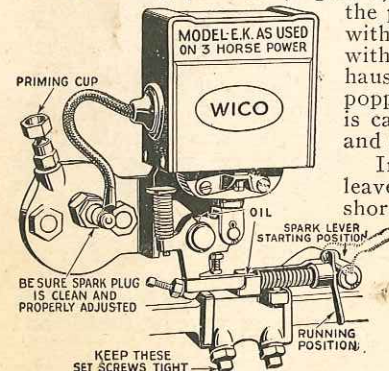


Figure 4.

### TO STOP THE ENGINE.

Shut off the gasoline by closing the fuel valve on the mixer. Turn the small lever on top of the lubricator down, which shuts off the oil, and drain the water out of the cylinder in cold weather.

## TO START 5 to 14 HORSE-POWER ENGINES ON COMPRESSION.

We do not furnish starting cranks with the 9 to 14 horse-power engines; they should always be started in the following manner:

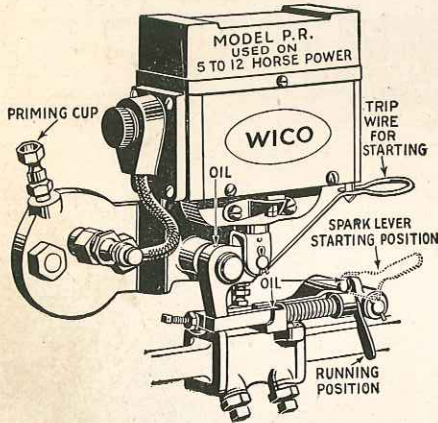


Figure 5.

**First.** Open the priming cup (Figure 5) (screw the top to the left two turns) to relieve compression, turn on the oil by raising the small lever on top of the lubricator.

**Second.** Place the spark lever in the starting position and turn the flywheels to the right until the igniter trips, then stop.

**Third.** Prime the cylinder by filling the priming cup four times with gasoline and let it run into the cylinder. Then close the cup with your fingers by turning to the right. Do not use a wrench.

**Fourth.** Open fuel valve on the mixer (Figure 2) two full

turns to the left and turn the air damper up so it closes the opening in the mixer, then turn the flywheels to the right one-half turn, or until the piston is out of the cylinder as far as it will come.

**Fifth.** Take hold of a spoke in the flywheel at the top with your right hand and put your right foot on a spoke at side nearest the magneto, pull with your right hand and push down with your foot, giving the flywheels a quick turn back toward the cylinder, at the same time trip the magneto by pushing down on the trip wire (on the 5 horse-power slip a screw-driver between the armature and magneto body and push down on the handle).

A little practice may be needed to do this just right, but in a short time you will find you can start the engine easily.

**Sixth.** As soon as engine starts open the air damper on the mixer (Figure 2), push the spark lever down to the running position and close the fuel valve slowly until the point is reached where the engine runs with the least number of explosions, as explained on page 3.

### TO STOP THE ENGINE.

Shut off the gasoline by closing the needle valve on the mixer. Turn the small lever on top of the lubricator down, which shuts off the oil, and drain the water out of the cylinder in cold weather.

### THE WATER IN THE HOPPER SHOULD BOIL.

The hotter the water gets the better the engine runs, because the gasoline vaporizes more readily and the engine will use less gasoline. The cylinder is cooled by the water circulating around it and the heat passes off in the form of steam, so if the water boils you need not be alarmed. Keep the cylinder properly lubricated (see page 2) and the reservoir full of water and there will be no danger of your engine overheating. **IN COLD WEATHER DRAIN THE RESERVOIR AT NIGHT TO PREVENT FREEZING**, by opening the drain cock in bottom of cylinder and removing the plug in bottom of cylinder head.

### TO START IN COLD WEATHER.

All gasoline engines are harder to start during cold weather than in warm weather, because gasoline does not vaporize as readily in cold weather. You can overcome this to a certain extent by pouring a couple of gallons of warm water in the water reservoir to warm up the cylinder, causing the gasoline to vaporize more readily. (Be careful if engine is real cold not to use water too hot, as the sudden change may crack the cylinder.) It is also advisable to open the fuel valve farther than you generally do, and be sure to close the air damper when starting and leave it partially closed for a few minutes until the engine gets warmed up. Prime the engine by filling the priming cup four or five times and let it run into the cylinder. No priming cup furnished on 1½ to 2¼ horse-power engines. Work the intake valve in and out before starting, as this will remove any frost that may have collected on the valve stem and allow valve to work easily. Oil both valves every time you run the engine.

### HOW TO ADJUST THE FUEL VALVE.

The mixing valve (Figure 2) is of the suction feed type, gasoline being drawn from the tank in the base by the suction of the piston. The air and gasoline are mixed in this valve to form the explosive gas.

When you start the engine, open the fuel valve two full turns to the left, close the air damper and turn the flywheels to the right; this draws a supply of gasoline from the tank and primes the valve. After the engine is running open the air damper and close the fuel valve slowly until the point is reached where the engine runs with the least number of explosions and without black smoke appearing at the exhaust, or a popping sound at the mixer, the latter being caused by an insufficient supply of fuel, and smoke at the exhaust by too much fuel.

If it is ever necessary to take the mixing valve and feed pipe off the engine, be very careful not to lose the valve out of the check valve, because if this valve is not in place your engine will not get any gasoline. To drain gasoline from tank remove drain plug. (See Figure 2.)

### OUT OF GASOLINE.

If your engine is running all right with the fuel valve set at the right point, and it starts to misfire, runs irregularly and explodes through the air inlet or gasps for breath, the supply of gasoline is low and the tank should be refilled; or if there is gasoline in the tank, then the check valve is leaking and should be ground to a good seat or be replaced with a new one. (See page 12.)

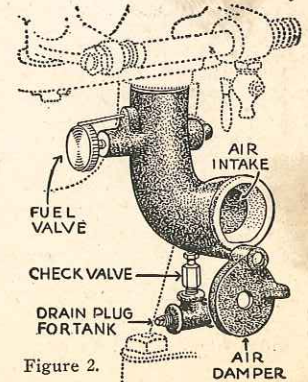


Figure 2.

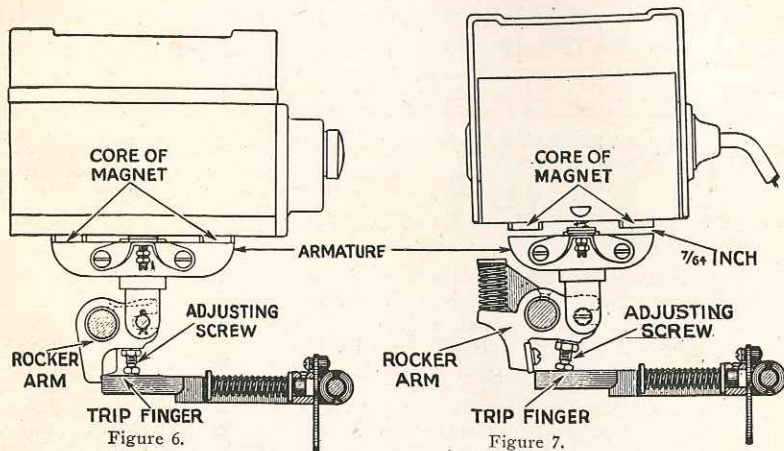


Figure 6.

Figure 7.

### TESTING MAGNETO FOR SPARK.

Detach the wiring from spark plug, hold the end about  $\frac{1}{8}$  of an inch away from the spark plug and trip the magneto by hand. If the spark jumps to the plug the magneto is all right.

Take out the spark plug, attach the wire to it and lay the plug in the igniter hole so that it makes a contact with the engine, trip the magneto by hand; if you get no spark the points may be too far apart. (They should not be over  $\frac{1}{16}$  of an inch.)

The points may be sooted or the porcelain in the plug may be cracked so the current jumps inside of the plug. Watch the adjustment of oil and gasoline (see pages 2 and 5) and you will not have any trouble with carbon. Clean plug if dirty and be sure when putting it back together that points are properly adjusted, not over  $\frac{1}{16}$  of an inch apart. If porcelain is cracked, buy a new one.

Oil magneto with regular engine cylinder oil, as shown in Figure 5, page 4, each time you run the engine; not too much, only a few drops. Keep the magneto clean and be sure the surfaces between the armature and poles of magneto are clean.

### HOW TO ADJUST MAGNETO.

The adjusting screw on rocker arm must be set so that the trip finger will slip off the lip of the rocker arm just after the breaker points on the inside of the magneto box have been opened by the downward movement of the armature.

This is properly adjusted when you get the engine and should never be changed, but if at any time it should be necessary to make this adjustment, proceed as follows:

Trip the armature from its contact with the cores and insert a strip of metal  $\frac{7}{64}$  of an inch thick (the thickness of two pennies) between the armature and the face of the cores (Figure 7), turn the flywheels to the right slowly until the trip finger strikes the rocker arm. The edge of the trip finger should just engage the edge of the lip on the rocker arm, not more than  $\frac{1}{32}$  of an inch, and the adjusting screw should be just touching the top of the trip finger (Figure 7), so that any further movement of the trip finger will cause it to slip off the edge of the rocker arm.

If the trip finger does not strike the lip of the rocker arm when the armature is set in the above position, turn the adjusting screw to the right until the trip finger does strike the lip on the rocker arm.

If the trip finger engages the lip on the rocker arm too much, more than  $\frac{1}{32}$  of an inch, unscrew the adjusting screw so as to push the trip finger down.

To change the position of the adjusting screw, remove the lock nut, then change the screw and be sure to tighten the lock nut after the adjustment has been made. Be sure to remove metal from between armature and core.

If the edge of trip finger becomes worn, take hold of the finger with a pair of pliers and pull it out of the bracket, giving it a one-quarter turn before replacing.

On the  $\frac{1}{2}$  to  $3\frac{1}{2}$  horse-power engines, a fresh edge on the rocker arm may be had by loosening the latch block screw and giving the latch block a quarter turn before replacing it. The screw holding this block is headed over on the outer end; this should be filed off before attempting to loosen the screw.

### TO BE SURE MAGNETO FURNISHES SPARK AT RIGHT TIME.

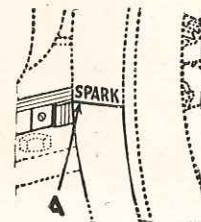


Figure 11.

Turn the flywheel to the right until the piston is in the cylinder as far as it will go on the compression stroke. Just opposite the cam rod that runs alongside of engine on the flywheel you will find the word "spark" (Figure 11).

See that the bracket holding the trip finger for the magneto is securely fastened to the cam rod, and with the spark lever in the running position see that the magneto trips when the word "spark" on the flywheel is just opposite the top of the cam rod. If the word "spark" has passed the top of the cam rod, or is below the cam rod, change the adjusting screw that controls the trip finger one way or the other until the spark takes place at the right point. Do not move the bracket that holds the trip finger.

### BREAKER POINTS AND THEIR ADJUSTMENT.

The breaker points are properly adjusted at the factory and no readjustment will be required except sometime in years to come when new points may be necessary.

The breaker points No. 301 and No. 223 (Figure 10) should just touch when the armature is  $\frac{7}{64}$  of an inch from the cores (Figure 7, page 6). Trip the armature from its contact with the cores and slip two copper pennies in between them, loosen the nuts No. 302 on the breaker point stem and turn the upper nut until the contact No. 223 just touches the contact No. 301, then hold the upper nut and tighten the lower one, locking the two together. After adjustment is made be sure to remove the copper pennies before starting the engine.

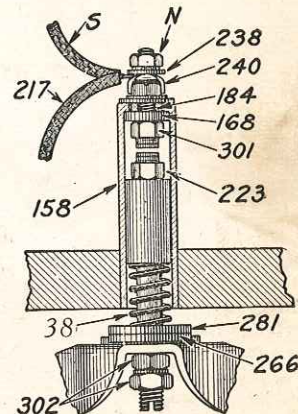


Figure 10.

### TO REPLACE BREAKER POINTS.

When replacing points be sure to get two new ones (see page 19), as if either contact fails it may leave the other in such uneven shape as to spoil the new one.

To replace lower contact No. 223 (Figure 10) pull out the wire No. 253 (Figure 9) and withdraw the moving parts (Figure 9) and take out the old contact and its spring No. 38 from the breaker point by unscrewing the two nuts No. 302B. Put in the new contact and be careful to replace the felt washers Nos. 266 and 281 (Figure 10).

To replace upper contact No. 301 (Figure 10) disconnect the condenser lead S and primary lead No. 217, take off all the nuts and washers and push the contact and the two washers No. 168 and No. 184 down and out of the tube.

New insulating washers No. 168 and No. 184 and new nuts will be furnished with new contact and these should always be used in replacement. Place insulating washers on new contact and insert in tube, replace outside insulating washer, cover it with a large brass washer and lock washer and screw them up tight. Replace the two washers No. 240 and No. 238 and the nut, insert the two leads and set the nuts up tight. After replacing the moving parts see that the contacts are in proper adjustment as explained above.

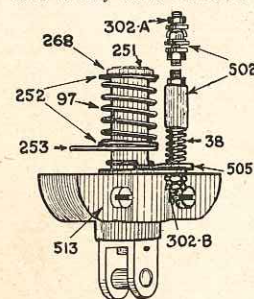


Figure 9.

## THE GOVERNOR.

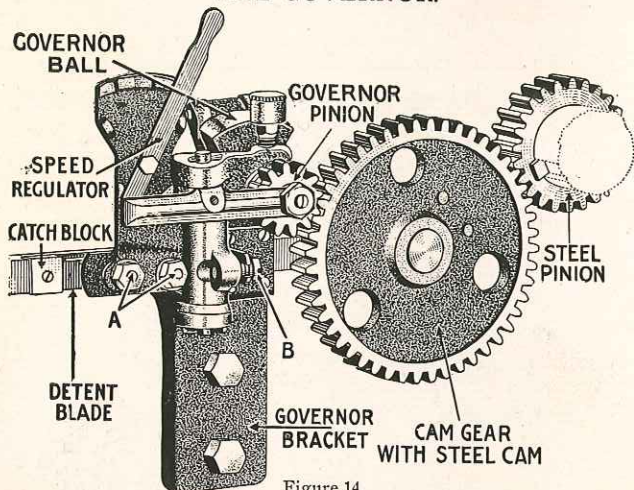


Figure 14.

The governor controls the speed of the engine and is of the hit and miss fly ball type. When the engine runs above its regular speed the balls on the governor widen their circuit, which presses in on the pin going through the governor spindle. This forces the detent blade in so that it catches behind the block on the cam rod and holds the exhaust valve open, at the same time stopping the spark and cutting off the supply of gasoline, until the speed of the engine is reduced to where it should be, then the detent blade flies out again, releasing the cam rod, and the engine takes up its regular operations.

### HOW TO ADJUST THE DETENT BLADE.

When the exhaust valve is wide open and the detent blade is pushed in behind the catch block on the cam rod, there should be only the thickness of a postal card between the end of the detent blade and the catch block. To adjust the detent blade on 1 $\frac{3}{4}$  to 14 horse-power engines, set the speed lever in position, as shown at top of this page; as the detent blade passes the catch block the blade should stand about  $\frac{3}{4}$  inch away from the block. If the detent blade is out more than  $\frac{3}{4}$  inch take a pair of pliers and bend it into the proper position. On the 1 $\frac{1}{2}$  horse-power engine construction of governor is different but adjustment is the same.

To adjust the play between the end of the detent blade and the catch block loosen the locknut "A" and screw the adjusting screw "B," either in or out, until you have the blade where it should be, then tighten the locknut.

### TO TAKE OFF THE GOVERNOR BALLS, SPINDLE OR PINION.

If you find it necessary to take the governor apart, first take off the governor pinion. To do this hold the flywheel stationary, which locks the gears, take out the set screw in the pinion, then take a wrench, stand on the governor side of the engine and turn the governor balls to the right, as the pinion is put on with a right hand thread. The governor spindle screws into the governor pinion.

### THE DETENT CATCH BLOCK.

The catch block on the cam rod is made of tool steel and should last a long time. If the block should wear on one side so it does not hold the detent blade properly, file off the point of screw where it is riveted on side of rod next to the engine, remove the screw with a screwdriver and turn the catch block around, using the other side. After both sides of the block are worn, buy a new one. (See 47G054 in list of repairs, page 16.)

## THE CAM ROD SPRING.

The cam rod spring holds the cam rod and roller against the cam on the cam gear. As this spring does a lot of work it may wear out; if it does, buy a new one. (See 47G059 in list of repairs, page 16.) To put on a new spring remove the cylinder head, slip the spring over the end of the cam rod and replace the cylinder head. If necessary to repack cylinder head see page 10.

## HOW TO TAKE OFF A FLYWHEEL OR PULLEY.

To take off the flywheel loosen the bolt and drive an iron or wooden wedge into the slot, one on each side of the hub. This will loosen the flywheel so it can be removed. To take off the pulley on the 1 $\frac{1}{2}$  to 2 $\frac{1}{4}$  horse-power engines loosen the set screw with a screwdriver and drive the pulley off.

On the larger engines all you have to do is loosen the nuts, take out the bolts or cap screws and the pulley will come off.

If you have to drive the flywheel or pulley off the shaft, use a piece of hardwood against the hub of the wheel and do not drive too hard. A number of light blows will loosen the flywheel without danger of breaking.

## TO REMOVE GASOLINE TANK.

Take off the fuel pipe which connects the tank to the mixing valve and the filler pipe on the side of the engine and tip the engine up on the flywheels.

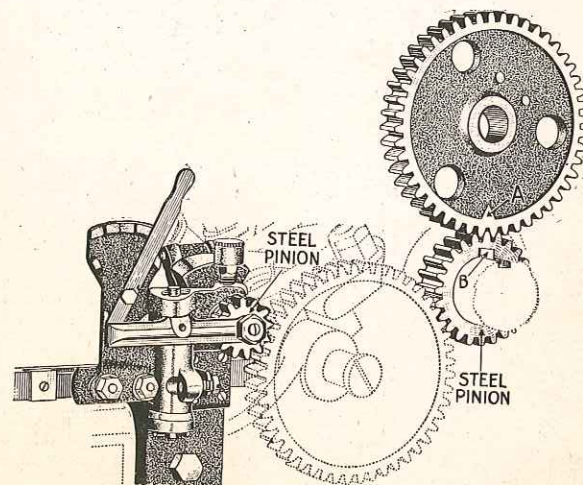


Figure 15.

## HOW TO PUT ON THE CAM GEAR.

If it is ever necessary to take off the cam gear or to put on a new one it must be put on in a certain position, as the cam on the gear controls the time of the spark and the opening and closing of the valves. In fact, every operation of the engine depends on this cam being set just right.

To put on the cam gear turn the flywheels around until the key in the crankshaft is straight up, as shown by "B" in Figure 15; then set the two teeth that are just under the indicator "A" on the cam gear over the one tooth that is just above the key "B"; then roll the cam gear around to the right until it reaches the position as shown by dotted gear, being sure to keep the gear teeth together. Then slip the cam gear pin in place and fasten it with the lock washer and nut.

Be very careful in putting on this gear to see that it is just right. One tooth out of the way makes quite a little difference in the way your engine will run.

## BE SURE YOU ARE USING THE RIGHT PULLEYS ON ENGINE AND MACHINES IT IS DRIVING.

The machines you run with an engine, to give you satisfactory service, must be equipped with the proper size of pulley to correspond with the pulley on the engine.

To be sure that the pulleys you are using are the right size to give the best results, take the speed of the engine multiplied by the size of the pulley on the engine and divide the result by the speed of the machine that you want to run. The result will give you the size of the pulley you should have on the machine.

If there is a pulley on the machine you want to run, to find out what size of pulley to use on the engine, take the speed of the machine multiplied by the diameter of the pulley on the machine and divide by the speed of the engine you are going to use, which will give the size of pulley you should have on the engine to give the best results.

### REPACKING THE CYLINDER HEAD.

We use a special gasket between the cylinder and cylinder head to prevent the escape of the compressed gas, which we have found to be the best for this type of engine.

If it is ever necessary to replace this gasket, be sure to use the special gasket that we furnish under 47G17 on page 14. Before putting on the new gasket be sure all particles of the old gasket are scraped off so the face of cylinder and the cylinder head show a smooth, clean surface.

After you have the packing in place push the cylinder head in close to the cylinder and screw on the nuts by hand as far as they will go, then use a wrench and turn each nut, one after the other, about one-half turn at a time. Do not screw one nut down perfectly tight and then go to the next, as this causes an uneven joint and the gasket will not hold. After the engine has been running for about ten minutes tighten the nuts again and you will have a perfectly tight joint. Be sure you have large enough wrench to get nuts tight. It is a good plan to go over these nuts occasionally to be sure they are tight.

### INTAKE AND EXHAUST VALVES.

There is a certain amount of gummy substance in all fuel, including gasoline, that sometimes collects on the exhaust valve stem, causing the valve to stick. A little kerosene squirted on the valve stem from the outside will usually relieve this.

A little particle of carbon or dirt may get under one of the valves, causing them to leak a little. To overcome this, while the engine is running take a block of wood and tap the end of the valve just as the piston goes in on the compression stroke and the compression will blow out the dirt, allowing the valve to seat properly. If you can't start engine, have some one turn the flywheels around by hand while you tap the end of the valve.

If the valves need regrinding, remove the cylinder head, take off the valve springs, remove the valves and clean thoroughly with kerosene. Then smear a fine grade of valve grinding compound (47G196, page 15) on the valve and the valve seat, put the valve in place and slip a nail through the hole in the outer end of the valve stem. Grasp the nail with your fingers and turn the valve from left to right for a minute or so, then lift the valve off its seat and turn it about one-half way around, then turn it again from left to right for two or three minutes, repeating this until the valve and valve seat show an even surface all the way around. When through, wash the cylinder head and valve carefully with kerosene to remove any of the valve grinding compound.

## BEARINGS.

The crankshaft bearings and the bearing in the crankshaft end of the connecting rod are made of a special die cast babbitt. They are fitted with steel liners so you can take up any wear in the bearings. If the bearing is too loose to be tightened by drawing down the nuts remove the bearing cap and take out enough of the strips from both sides of each bearing so they fit snug.

After you have removed the strips and put the cap back on again, screw down the bolts, but before starting the engine open the exhaust valve by pushing the detent blade in behind the catch block on the cam rod and turn the flywheels around by hand to see that they turn freely. If they bind you have taken out too many strips and you will have to put enough back until the flywheels turn easily. A bearing should be neither too tight nor too loose; it must fit snug and the engine never be allowed to run when it is loose.

The main bearings on  $1\frac{1}{2}$  to  $2\frac{1}{4}$  horse-power have a babbitt backing that must be poured in if it is ever necessary to replace them. The regular boxing is die cast; these we can furnish. See 47G8, page 14.

### PISTON AND RINGS.

The piston should be a snug fit in the cylinder but the rings are really what hold the compression and must fit free in the grooves of the piston. Feeding a poor grade of gasoline or lubricating oil, or too much of either, will cause a carbon deposit to form around the rings, which will in time bind them in the grooves, so they cannot spring out against the walls of the cylinder to hold the compression. It is very necessary that you use the proper grade of oil, a good grade of medium gas engine cylinder oil, also watch the supply of gasoline, for on this depends the proper running of the engine.

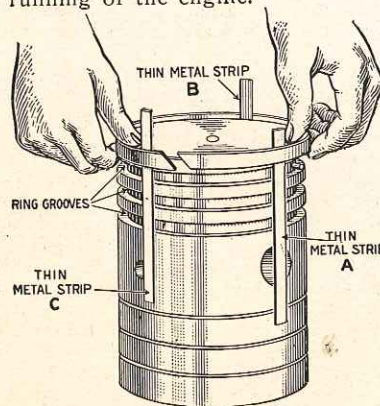
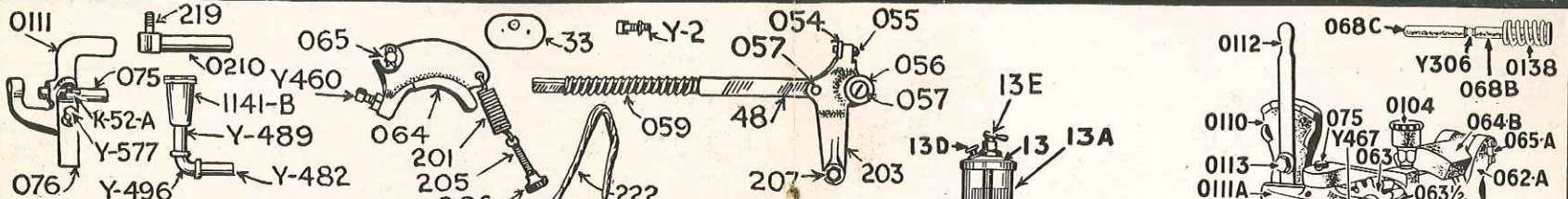


Figure 16.

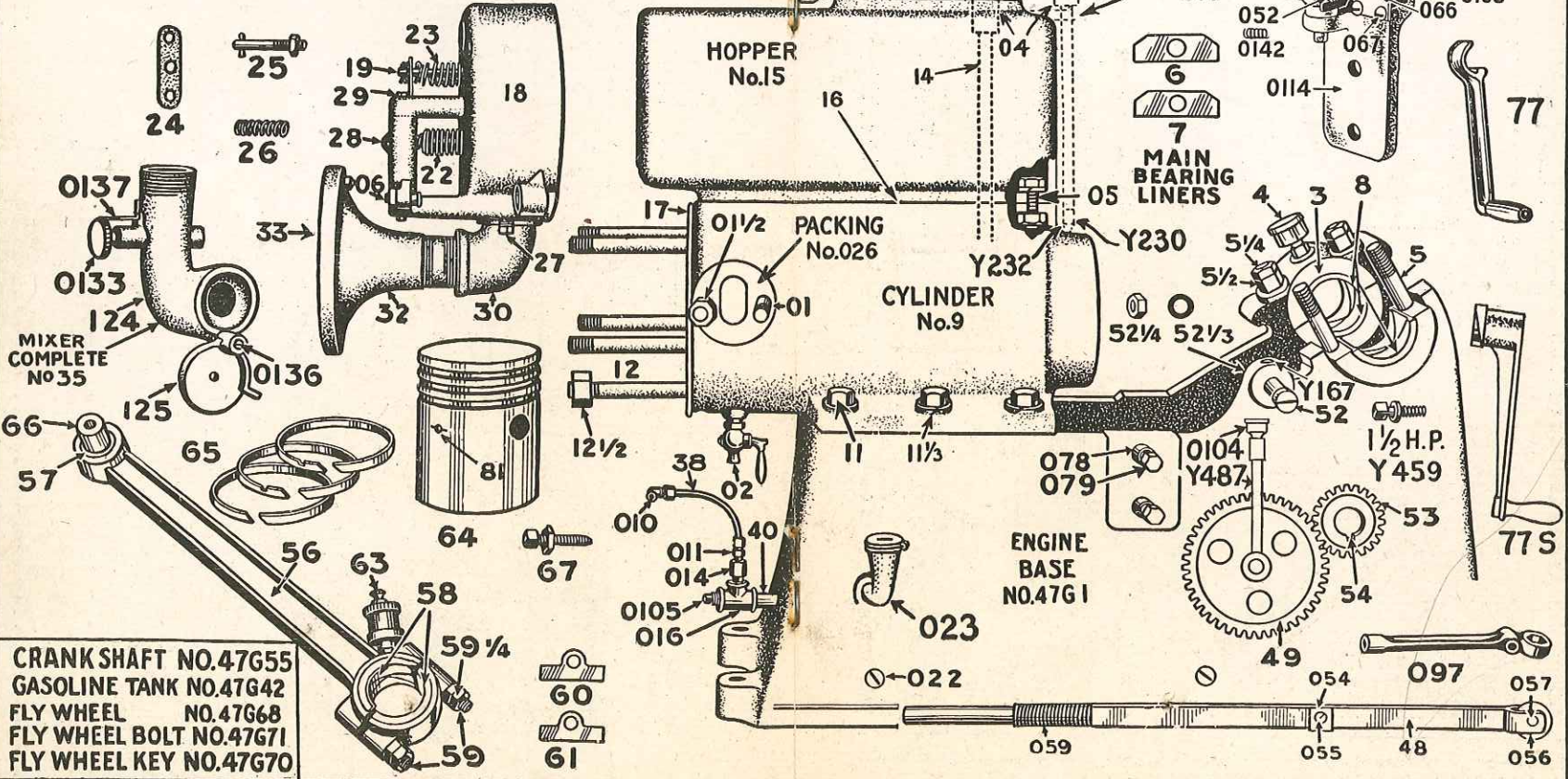
To remove the piston from the cylinder take out the governor spindle, as instructed at bottom of page 8. Take out the connecting rod bolts where it fastens around crankshaft, disconnect rod from the shaft and pull the piston out of the cylinder.

To remove the rings from the piston take three thin metal strips (pieces of an old hack saw blade are fine for this) and slip under the center ring. Start the first strip under the ring at the joint and force it all the way around until you have it at the position shown by "A," Figure 16, then slip the second strip to "B" and the third to "C," which will raise the ring out of the groove so it can be slipped off. Take the top ring next and repeat the operation; then the bottom ring.

In replacing the rings, put the center ring on first, using the three metal strips as before, then without the three metal strips you can slip the top ring on and then put the bottom ring on, bringing it up from the bottom of the piston. Before putting the piston back in the cylinder, oil the rings and surface of the piston thoroughly.



**Above Parts Used On 1 1/2 Horse Power Model N Engines**

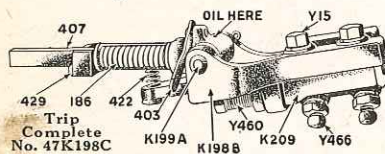
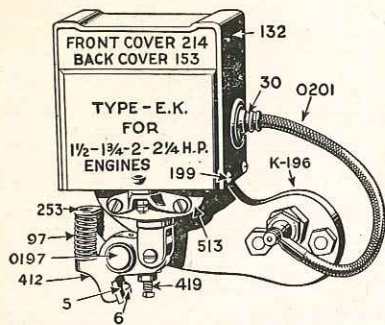


- CRANKSHAFT NO.47G55
- GASOLINE TANK NO.47G42
- FLY WHEEL NO.47G68
- FLY WHEEL BOLT NO.47G71
- FLY WHEEL KEY NO.47G70

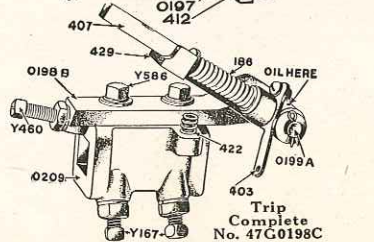
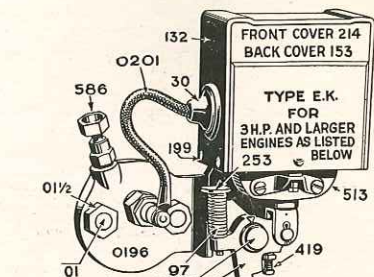








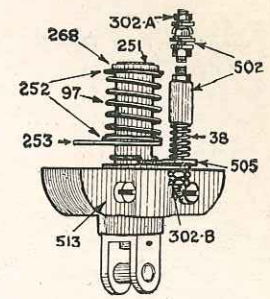
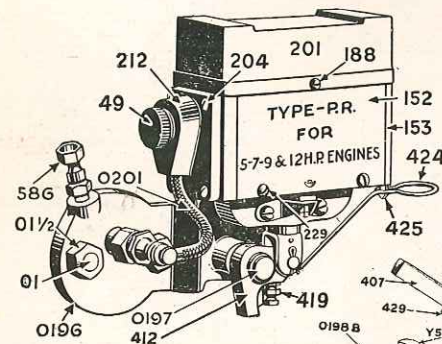
For illustration of Armature and Spark Points, see opposite page.



**Parts Price List of Wico Type E. K. Magneto as Used on 1 1/2 H.-P. Model N, 1 3/4 H.-P. Model S and 2, 2 1/4, 3, 3 1/2, 6, 8, 10 and 14 H.-P. Model G and H Economy Engines**

Part No.	Item	List	Part No.	Item	List
47G5	Latch Block	\$0.35	47G302B	Breaker Point Nut	\$0.05
47G6	Latch Block Screw and Lock Washer	.05	47G403	Eccentric Lever	.25
47Y15	Cap Screw with Washer, 1 1/2, 1 3/4, 2 and 2 1/4 H.-P.	.10	47G407	Trip Finger	1.00
47G30	Terminal Ins. Block	.30	47G412	Rocker Arm Group	1.25
47G38	Terminal Contact Spring, not shown	.20	47G419	Adjusting Screw, Nut and Washer	.20
47G97	Armature Return Spring	.40	47G422	Trip Finger Support Spring	.15
47G132	Side Band	1.00	47G429	Trip Finger Frame	.75
47G153	Back Cover	.35	47Y460	Set Screw with Locknut, 1 1/2 to 1 4 H.-P.	.10
47Y167	Set Screw with Locknut, 3 to 14 H.-P.	.10	47Y466	Set Screw with Nut, 1 1/2, 1 3/4, 2 and 2 1/4 H.-P.	.10
47G186	Trip Finger Spring	.25	47G502	Breaker Points (set of two with washers)	2.00
47K196	Magneto Bracket, 1 1/2, 1 3/4, 2 and 2 1/4 H.-P.	1.90	47G505	Breaker Point Lubricating Felts (set of two)	.10
47K198A	Adjustable Valve Rod Clamp Assembly	1.75	47G513	Armature	1.75
47K198B	Trip Bracket only, 1 1/2, 1 3/4, 2 and 2 1/4 H.-P.	.25	47G586	Priming Cup, 3 to 14 H.-P.	.25
47K198C	Tripping Equipment Complete, 1 1/2, 1 3/4, 2 and 2 1/4 H.-P.	3.00	47Y586	Cap Screw with Washer, 3 to 14 H.-P.	.10
47G199	Ground Connection and Side Band Screw	.05	47G01	Igniter Stud	.20
47K199A	Trip Finger Pin, Cotter Key and Washer, 1 1/2, 1 3/4, 2 and 2 1/4 H.-P.	.15	47G01 1/2	Igniter Stud Nut	.10
47K209	Trip Bracket Clamp, 1 1/2, 1 3/4, 2 and 2 1/4 H.-P.	.30	47G0196	Magneto Bracket, 3 to 14 H.-P.	2.20
47G214	Front Cover	.50	47G0197	Rocker Arm Stud, 1 1/2 to 1 1/4 H.-P.	.40
47G235	Condenser, not shown	3.00	47G0198C	Trip Bracket Complete, 3 to 14 H.-P.	3.10
47G253	Return Spring Support	.10	47H0198B	Trip Bracket Only, 3 to 14 H.-P., adjustable type	.25
47G302A	Breaker Point Nut	.05	47G0199A	Trip Finger Pin, Cotter Key and Washer, 3 to 14 H.-P.	.25
			47G0201	Lead Wire with Terminal and Intensifier	.80
			47H0209	Trip Bracket Clamp, 3 to 14 H.-P.	.40
			47K211	Standard 1/2-Inch Spark Plug	.75

All items on this page will be shipped by parcel post, postage paid.



**Parts Price List of Wico Type P.R. Magneto as Used Only on 5, 7, 9 and 12 H.-P. Model G and H Economy Engines.**

Part No.	Item	List	Part No.	Item	List
47G38	Terminal Contact Spring	\$0.20	47G419	Adjusting Screw, Nut and Washer	\$0.20
47G49	Lead Wire Connection Plug	.15	47G422	Trip Finger Support Spring	.15
47G97	Armature Return Spring	.40	47G424	Starting Handle	.50
47G152	Front Cover	.60	47G425	Starting Handle Catch	.10
47G153	Back Cover	.40	47G429	Trip Finger Frame Group	.75
47Y167	Set Screw with Locknut	.10	47G502	Breaker Points (set of two with washers)	2.00
47G186	Trip Finger Spring	.25	47G503	Guide Rod Group, not shown	.60
47G188	Hood Screw	.05	47G505	Breaker Point Lubricating Felts (set of two)	.10
47G199	Ground Connection Screw, Ground Cover Screw, not shown	.05	47G513C	Armature Group	2.00
47G201	Hood	1.00	47G514	Guide Rod Lubricating Pad, not shown	.10
47G204	Terminal Cover Screw	.05	47G586	Priming Cup	.25
47G212	Terminal Cover	1.25	47Y586	Cap Screw and Washer	.10
47G215	Ground Connection Screw Lock Washer, not shown	.05	47G01	Igniter Stud	.20
47G229	Front Cover Screw	.05	47G01 1/2	Igniter Stud Nut	.10
47G235	Condenser, not shown	3.00	47G0196	Magneto Bracket	2.20
47G245	Ground Lead Clamp, not shown	.05	47G0197	Rocker Arm Stud	.40
47G251	Return Spring Retaining Ring	.05	47G0198A	Adjustable Valve Rod Clamp Assembly	1.75
47G252	Return Spring Washer	.05	47G0198C	Trip Bracket Complete	3.10
47G253	Return Spring Support	.05	47H0198B	Trip Bracket Only adjustable type	.25
47G268	Retaining Ring Cup Washer	.05	47G0199A	Trip Finger Pin with Key and Washer	.25
47G269	Return Spring Adjusting Washer	.05	47G0201	Lead Wire with Terminal and Intensifier	.80
47G302A	Breaker Point Nut	.05	47H0209	Trip Bracket Clamp	.40
47G302B	Breaker Point Nut	.05	47K211	Standard 1/2-Inch Spark Plug	.75
47G403	Spark Layer	.25			
47G407	Trip Finger Group	1.00			
47G412C	Rocker Arm Group (with hand starting pin)	1.50			

All items on this page will be shipped by parcel post, postage paid.

### Parts for Belt Driven Vertical and Horizontal Pump Jacks.

For No. 312 and 337 Jacks, be sure to give No. of Jack when you order.

Part No.	Name of Part	
†47J1	Main Base.....	\$3.00
*47J2	U Bolt and Nuts.....	.40
*47J3	Crank Gear.....	1.90
*47J4	Gear Shaft.....	.40
*47J5	Small Gear.....	.65
*47J6	Gear Shaft.....	.65
*47J7	Tight Pulley.....	2.10
*47J8	Loose Pulley.....	2.00
*47J9	Crosshead.....	.90
*47J10	Crosshead Clamp with Nuts, each.....	.25
*47J11	Pump Arms, each.....	.90
*47J12	Crank Pin Washer.....	.05
*47J13	Crank Pin with Nut and Cotter.....	.75
*47J14	Clamp Body.....	.30
*47J15	Clamp Cap.....	.25
*47J16	Clamp Pin and Cotter Pin.....	.16
*47J17	Clamp Bolt and Nut.....	.15
*47J18	Clamp, complete.....	.95
*47J19	Pulley Set Screw.....	.05
*47J20	Extra Stand for Horizontal Jack.....	.80
*47J21	Bolt for Attaching Stand, each.....	.10
*47J23	Crank Gear Set Screw.....	.15
*47A243	Spacing Collar.....	.10
*47A254R	Gear Guard.....	.30
*47A254L	Gear Guard.....	.30

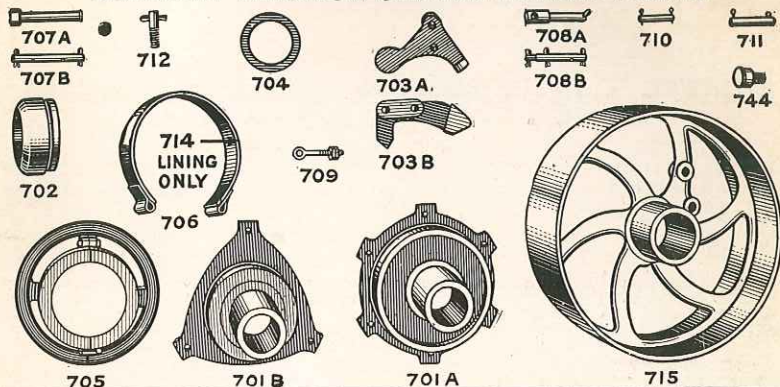
NOTE—All parts marked (\*) will be shipped by parcel post, postage paid. All parts marked (†) will be shipped by express, collect.

### Parts for Pump Jacks Nos. 338 and 339.

Part No.	Name of Part	
†47KJ1	Body.....	\$3.75
†47LJ1	Body.....	5.00
*47KJ2	Large Gear.....	2.90
*47LJ2	Intermediate Gear.....	1.55
*47KJ3	Crosshead.....	.75
*47CJ3	Clamp Bolt.....	.15
*47KJ4	Crank Arm.....	.55
*47CJ4	Grease Cup.....	.15
*47KJ5	Pinion.....	.40
*47KJ6	Clutch Lever.....	.25
*47KJ7	Pulley.....	1.75
*47LJ7	Pulley.....	1.75
*47KJ8	Clutch Throw-out.....	.15
*47KJ9	Clamp.....	.25
*47AJ10	Crank Pin.....	.25
*47KJ11S	Gear Guard.....	.50
*47LJ11S	Gear Guard.....	.50
*47AJ12	Crank Pin Washer.....	.05
*47AJ13	Pitman Arm (each).....	.75
*47AJ14	Cotter Pin.....	.05
*47BT14	Cotter on 339 only.....	.05
*47KJ15	Cotter.....	.05
*47AJ16	U Bolt.....	.15
*47AJ19	Set Screw.....	.05
*47KJ20	Gear Shaft.....	.45
*47KJ21	Pulley Shaft.....	.70
*47LJ21	Intermediate Gear Shaft.....	.60
*47AJ22	Rivet with Burr.....	.05
*47LJ23	Washer on 339 Only.....	.05
*47AJ25	Crank Pin Nut.....	.05
*47KJ25	Clutch Spring.....	.05
*47KJ26	Key for Gear.....	.05
*47PJ33	Grease Cup.....	.20

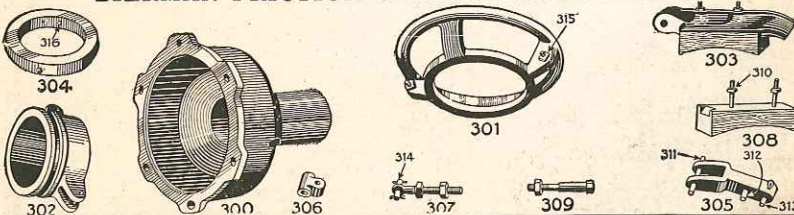
NOTE—All parts marked (\*) will be shipped by parcel post, postage paid. All parts marked (†) will be shipped by express collect.

### MEXICO FRICTION CLUTCH PULLEY PARTS.



Part No.	Be Sure to Give Diameter and Face of Pulley Rim	SIZE OF PULLEY				
		12x6	16x8	20x8	24x8	29x8
*47G701A	Pulley Spider.....		\$ 9.65	\$ 9.65	\$ 9.65	\$ 9.65
*47G701B	Pulley Spider.....	\$ 7.85				
*47G702	Expander Collar.....	4.70	4.80	4.80	4.80	4.80
*47G703A	Clutch Finger.....	2.20	2.20	2.20	2.20	2.20
*47G703B	Clutch Finger.....	2.20				
*47G704	Collar.....	2.15	2.30	2.30	2.30	2.30
*47G705	Hand Wheel.....	3.85	3.85	3.85	3.85	3.85
*47G706	Brake Band with Lining.....	5.35	6.85	6.95	6.95	6.95
*47G707A	Pin for Brake Band.....		1.10	1.10	1.10	1.10
*47G707B	Pin for Brake Band.....	.90				
*47G708A	Tension Pin with Cotter Pin.....		1.00	1.00	1.00	1.00
*47G708B	Tension Pin with Cotter Pin.....	.65				
*47G709	Eye Bolt Adjusting Screw.....	.90	.90	.90	.90	.90
*47G710	Eye Bolt Pin with Cotter Pins.....		.25	.25	.25	.25
*47G711	Pivot Pin with Cotter Pins.....		.40	.40	.40	.40
*47G712	Set Collar Screw.....	.25	.25	.25	.25	.25
*47G713	Brake Band Clamp.....	.50	.50	.50	.50	.50
*47G715	Pulley Rim.....	10.80	12.75	15.30	18.00	20.95
*47G744	Grease Cup.....	.60	.60	.60	.60	.60

### BIERMAN FRICTION CLUTCH PULLEY PARTS.



Part No.	Be Sure to Give Diameter and Face of Pulley Rim.	SIZE OF PULLEY		
		12x6 10x8	14x8 16x8	20x8 24x8
†47FC300	Clutch Spider.....	\$8.00	\$10.00	\$10.00
*47FC301	Hand Wheel.....	1.75	1.75	1.75
*47FC302	Sliding Sleeve.....	3.60	4.00	4.00
*47FC303	Brake Shoe and Block.....	1.50	1.50	1.50
*47FC304	Set Collar for Spider.....	1.00	1.50	1.50
*47FC305	Adjusting Arm.....	.75	1.00	1.00
*47FC306	Knuckle Joint.....	.50	.60	.60
*47FC307	Adjusting Eye Bolt.....	.50	.75	.75
*47FC308	Friction Block.....	.30	.40	.40
*47FC309	Adjusting Bolt.....	.50	.75	.75
*47FC310	Bolt and Nut for Brake Shoe.....	.15	.15	.15
*47FC311	Pin Long.....	.15	.15	.15
*47FC312	Pin Short.....	.15	.15	.15
*47FC313	Pin Short.....	.15	.15	.15
*47FC314	Pin.....	.20	.20	.20
*47FC315	Bolt and Nut for Hand Wheel.....	.15	.15	.15
*47FC316	Friction Collar Set Screw.....	.05	.05	.05

NOTE—All items marked (\*) will be shipped by parcel post, postage paid. All items marked (†) will be shipped by express collect.

## WHAT TO DO IF THE ENGINE FAILS TO START OR DOES NOT RUN SATISFACTORILY.

A gasoline engine is very easy to handle if you understand how it works. If you have a little trouble at first, do not blame the engine, but remember it is new to you and that it will take a little while to learn how to handle it. Study this book and the engine carefully and it will only be a short time until you know how to take care of the engine as well as our experts at the factory.

**FIRST.** Be sure the tank is full of gasoline.

**SECOND.** Open the fuel valve on the mixer three or four turns. Then turn the flywheels to the **left** until the piston starts in on the compression stroke. Close the air damper on the mixer and turn the flywheels to the **right** two full turns. Then open the damper and see if there is any gasoline in the mixer; if not, the fuel line is stopped up.

Dirt sometimes gets into the gasoline, clogging the pipes or stopping the check valve. To clean the check valve, loosen the nuts just above the valve with a wrench, remove and clean with gasoline. After cleaning the pipe and valve, drain tank by removing the drain plug, strain the gasoline through a chamois skin, and flush out the tank.

If engine will not run unless you keep the air damper closed, either the check valve in the fuel line or the intake valve in the cylinder head is leaking and should be ground to a good seat. See that valve lock (Figure 13) is adjusted to hold the intake valve shut when the exhaust valve is open.

**THIRD.** If in starting the engine you hear a hissing sound at the cylinder head, there may be a little particle of dirt under the exhaust or intake valve. Have some one turn the flywheels around to throw the piston against compression. Just as he does this, bump the end of the valve stem with a block of wood to open the valve, and the air pressure in the cylinder may blow out the dirt. If this does not stop the leak, the valve will have to be ground (see page 10).

Squirt a little kerosene on the exhaust valve stem occasionally, which helps to remove any carbon which may have accumulated and prevents valve stem from sticking. It is a good plan to put a few drops of oil on both valve stems every time you run the engine.

**FOURTH.** Refer to page 7 and go over the magneto carefully to be sure it is sparking properly and at the right time.

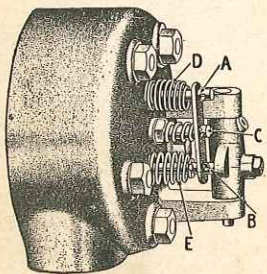


Figure 13.

A. Intake valve. D. Intake valve spring. B. Exhaust valve. E. Exhaust valve spring. C. Intake valve lock to hold Intake valve tight during the exhaust stroke.

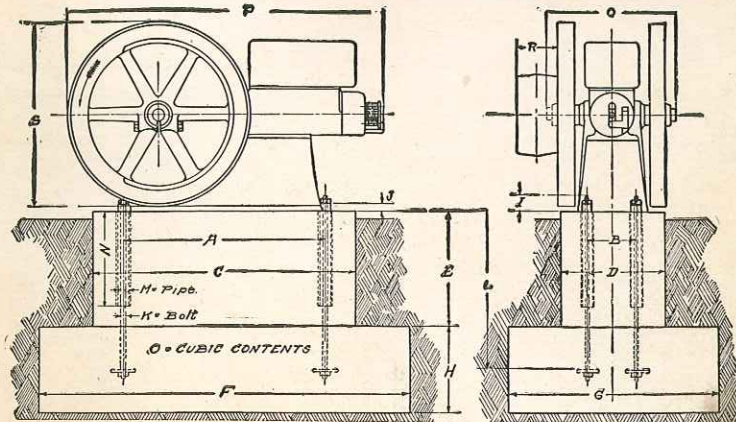
**FIFTH.** If there is a hissing sound in the cylinder, the rings may be stuck in their grooves. Take out the piston and clean the rings and grooves thoroughly, putting plenty of lubricating oil on the rings when you put them back in again.

If water gets into the cylinder or you hear a gurgling sound in the water reservoir when you turn the engine over against compression, the gasket between the cylinder and cylinder head has blown out and will have to be replaced (see page 10).

**SIXTH.** If you have had the cam gear off or changed its adjustment in any way, see page 9 to be sure it is set properly, as this cam controls the time the valves open and close.

**SEVENTH.** If after following the above instructions and going over the adjustment of each part according to the instructions in this book you still cannot get the engine to run properly, write us just what you have done, how the engine acts and we will tell you just what to do. Do not call in an engine expert unless you have the utmost confidence in his ability. Usually a neighbor who has an engine will be of more help. If not, go to your nearest garage or write us and we will advise you by return mail.

## TO MAKE A CONCRETE FOUNDATION FOR ENGINE.



ENG.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1½ H.P.	14½	5½	29	14	12	41	26	12	1½	¾	¾	18	1	10	10½	27½	19½	4	16½
1¾ H.P.	20	5½	29	14	12	41	26	12	1½	¾	¾	18	1	10	10½	30½	22½	4	18
2 or 2¼ H.P.	16½	7¾	29	14	12	41	26	12	1½	¾	¾	18	1	10	10½	32	2½	4	19½
3 or 3½ H.P.	25½	6½	36	18	18	48	30	12	2½	1½	½	24	1	15	16½	39½	2½	4	22
5 or 6 H.P.	29½	8	42	20	18	56	34	12	2½	1½	½	24	1½	15	22	46½	24½	4	28
7 or 8 H.P.	36½	9	48	20	18	66	38	18	2½	1½	½	27	1½	15	36	56½	26½	6	34
9 or 10 H.P.	41½	10	54	22	24	77	44	18	2½	1½	¾	33	1½	20	52	64½	28½	8	38
12 or 14 H.P.	47½	12	62	25	24	86	50	18	2½	1½	¾	33	1½	20	66½	73½	31½	8	44

To make a foundation like this dig a hole as long and wide as indicated by "F" and "G" and as deep as the sum of "E" and "H." If ground is not solid line hole with lumber or sheet metal to prevent caving. Make a box without top or bottom of size as indicated by "C," "D" and "E." Across the top of this box securely attach a couple of strips 2 or 3 inches wide, thickness as indicated by "J" and spaced as indicated by "A," measuring from center to center. These strips should be long enough to reach clear across the hole for foundation and box hung in the center of it. The top edges of box must be perfectly level. In the cross strips bore holes of size as indicated by "K" spaced as indicated by "A" and "B." Foundation bolts of length indicated by "L" fitted with large washers on the bottom should be hung from the cross strips. A piece of pipe or tubing larger than the bolt should be placed on the bolts as indicated by the dotted lines on the diagram. The pipe or tubing should come about ¼ inch below the top of the cross pieces and is put in so bolts can be shifted on account of a variation in the bolt holes in the engine base.

If engine is to be raised from ground the measurement "E" and length of bolts "L" should be increased to correspond with the height of foundation above ground, but measurements below ground must not be changed.

The concrete should be made up of one part good Portland cement, two parts clean sharp sand and four parts clean gravel or crushed stone. Mix thoroughly while dry and then add water, again mixing well till you have a good mixture. Place this in the foundation hole and fill up to within ½ inch of the top of the box. Then fill the remaining space with a mixture of one part cement and two parts sand mixed thoroughly and moistened sufficiently so it can be spread and troweled smooth. Let the foundation set for two or three days, when the wood forms can be removed and space around foundation filled with earth or cinders. Then mix cement and water about like thick cream and fill the spaces between the pipe and bolts. Mount the engine, put nuts on bolts and screw down tight. It will be best to let foundation harden for at least a week or ten days before using the engine.