

## HOW TO GET FULL POWER FROM THE ENGINE

This book gives pictures and drawings of the most important working parts of the engine; it tells you how to start and stop the engine, how to see that it is properly lubricated and how to take care of it. It also tells you what to do if the engine will not run.

We have exhausted every resource in getting up this book in order to make it perfectly plain so that all of our customers could understand it. It is really our representative that we send with the engine to tell you how to set up the engine, run it and take care of it.

If you will read this book carefully before you undertake to do anything with the engine, you will get much better results and have less trouble. You will be able to get more power from the engine with the least expense for gasoline and lubricating oil. If you will read this book carefully it will help you to get a better start and prevent delays later on. It will also prepare you to ask questions about the engine and you will know when the engine is adjusted and running properly.

By reading this book through once you may not get all the points or may not understand them thoroughly. Do not read it once and then lay it aside, go through it two or three times, if necessary, and examine the engine at the same time and you will get so you understand every part of the engine and know just what work it performs.

A great many people make a mistake in not getting acquainted with their engine themselves and then when they have trouble they call in a machinist, automobile man, plumber, millwright, blacksmith or even a hardware dealer, expecting them to put it in good condition. Many of the people we have mentioned above know very little more about operating a gasoline engine than you do. The machinist knows how it is made and could make a new part for you, but as a rule he could not tell you what was wrong with your engine or what you will have to do to set it right, and will often do the engine more harm than good.

Even if you call in an automobile man who has worked in a garage and understands automobiles thoroughly and put him up against a stationary engine, he has to study the matter over carefully to find out how the engine works before he knows what to do, and you can get exactly the same information from this book and will save the expense of the expert.

Remember, every gasoline engine is thoroughly tested before it leaves the factory and as it developed its full rated horse power at the factory you may rest assured that it will run all right for you and develop just as much power.

If an engine stops of its own accord, or will not start, you can very easily find out the cause if you will just stop to figure it out. Reason out the principles of a gasoline engine along the following lines:

**It must have gasoline.** Be sure you have plenty of gasoline in the tank and that it gets into the cylinder.

**The engine must have good compression.** To try the compression, bring the piston back good and hard against the compression by turning the fly wheels, and let go; if the piston bounds back when released, the compression is good; if not, investigate. (See paragraph 21 on page 14.)

**There must be a spark.** You get the spark at the igniter. This is where 75 per cent of the gas engine troubles originate and should be the first place to look for trouble. Make sure you are getting a spark when the engine refuses to run and be sure the spark occurs inside the cylinders. (See paragraph 14 on page 11.)

A great many men will try to start a gasoline engine, and if it refuses to run, they do not look for the trouble, but keep on trying to start it, until they have worn themselves out and then they are ready to give up and condemn the engine, when really they are to blame themselves. **If an engine does not start after the third or fourth trial there is something wrong—stop and investigate.** (See page 19.)

It is not our intention to criticise machinists, automobile repairmen, plumbers, and other well meaning persons, but stationary gasoline engine troubles can be quickly overcome with less expense and less time wasted by studying the instruction book and figuring it out for yourself. A gasoline engine is a machine in itself and it is necessary to get acquainted with it to thoroughly understand its troubles. Machinists, automobile men or plumbers know their own trades thoroughly and it is not expected that they should know anything about a gasoline engine, because they do not follow that line of work.

Don't think because a gasoline engine is simple that it will not cause trouble. If neglected something is sure to go wrong. Take just as good care of your engine as you would your binder or any other farm machinery and we are sure you will be well pleased with the result.

If after studying this book carefully you have any trouble with your engine, and you will write us full particulars, being sure to tell us just exactly how the engine acts, we can tell you just what to do to overcome your difficulty.

**Be sure to read the following pages of this book before you try to run your engine, it will save you time and trouble.**



**MOUNT YOUR ENGINE ON A SOLID FOUNDATION.****Paragraph 1.**

The Economy Gasoline Engines are very evenly balanced, but there is always some vibration if the engine is not securely fastened down. This vibration will cause bolts to loosen and will wear your engine out quicker than otherwise.

We do not guarantee an engine that is not properly bolted down to prevent this vibration.

The best method of mounting an engine is to make a concrete bed (see page 24). It may not be possible for you to make a foundation of concrete, if not, heavy planks securely fastened down should be used. Be sure the engine is fastened so it cannot vibrate and you will get much better results with less wear and tear on the engine.

If the engine is mounted on trucks be sure it is securely bolted to the channels, and brace the wheels when engine is running. Also brace the gasoline tank on the inside of base or it will shake loose and spring a leak.

**FITTINGS FOR YOUR ENGINE.****Paragraph 2.**

We furnish a full equipment with each Economy Engine. You will find all parts packed in the water reservoir, with the exception of muffler and battery box. These are fastened to the crate. If you do not get them or any of the other equipment that you paid for, have the agent make a note of the shortage on the receipt he gives you when you pay the freight charges. Send the receipt to us, explaining the matter and we will ship the parts at once, free of expense to you.

Put the glass oiler that you find in the water reservoir on the cylinder, as shown on page 5, No. 4.

The grease cups go on the main bearings and the connecting rod. (See No. 5 on page 5).

The funnel is to be used in filling gasoline can (No. 3, page 5).

The can of oil and grease are samples to show you what kind of oil and grease to use. If you want to buy more of the same kind you will find prices on page 30. Use only the best special gasoline engine oil and grease. The ordinary oil used on steam engines will not do and if used will ruin your engine. You had better buy the kind we list on page 30, which is the best, and thereby insure yourself against trouble.

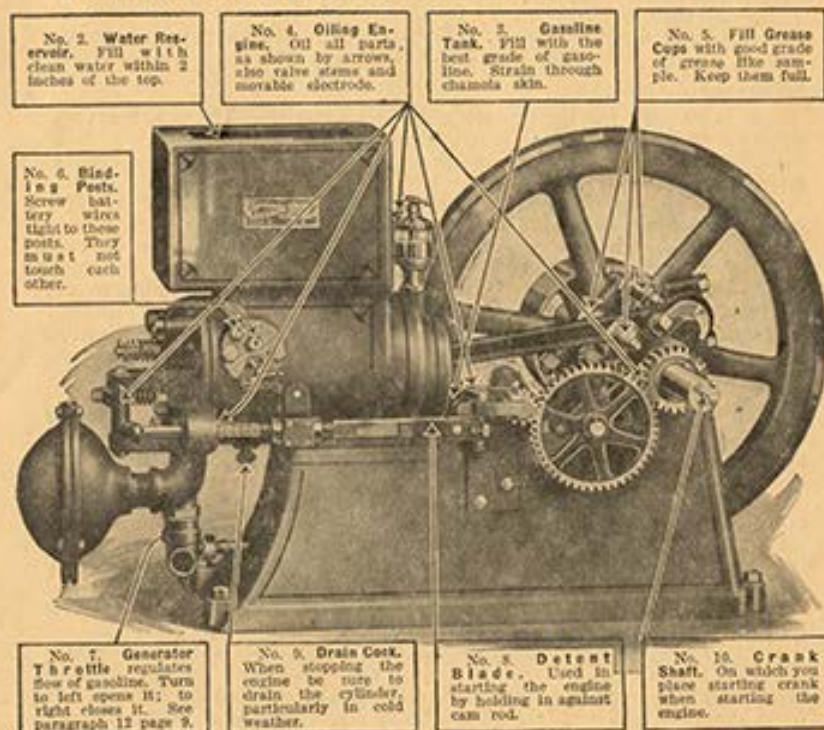
We furnish monkey wrench and igniter wrench; the large end of the igniter wrench is to tighten the bolts on igniter; No. 216, page 22. The other end is used to tighten the set screw on the piston in the cylinder (see 6 on page 23). We also furnish combination pliers and an oil can. These tools are really all you will ever need in taking care of the engine or in putting on any new parts.

**PIPING FOR EXHAUST.****Paragraph 3.**

If you are going to use the engine inside, fasten it down securely, then get a piece of pipe of the proper length and the same size as

the piece we furnish and run the pipe outside, putting the muffler on the end of the pipe so as to deaden the sound outside.

Never use a smaller pipe for the exhaust than the one we furnish with the engine, a larger one is even better. If it is possible for you to do so, we recommend that you use the short pipe and muffler that we furnish, as the engine will use less gasoline and give better results.

**HOW TO START THE ECONOMY GASOLINE ENGINES.****Paragraph 4.**

1. Be sure the engine is securely bolted down or fastened on truck.
2. Fill the reservoir, No. 2, with clean water.
3. Fill the tank, No. 3, with the best grade of gasoline.
4. Oil all parts as shown by arrows No. 4.
5. Fill grease cups, No. 5, with good grade of grease, like sample.
6. Attach battery with wire to binding posts, No. 6.



7. Open numbered dial on generator, No. 7, three-quarters of a turn to the left, push up on the stem at the bottom of generator and hold it until gasoline drips.
8. Turn fly wheels around by hand until detent blade, No. 8, catches behind the block on cam rod. This holds the exhaust open.
9. Turn on the batteries by closing the switch.
10. Put crank on shaft, No. 10, hold detent blade, No. 8, in against the cam rod, turn the fly wheels around rapidly five or six times, release the detent blade No. 8, remove the crank, but do not let go of it, as it may fly off and hit you.
11. Regulate throttle, No. 7. (See paragraph 12 on page 9.)

#### TO STOP THE ENGINE.

##### Paragraph 5.

It is an easy matter to stop a gasoline engine. There are several ways to do it, but there is just one way that is right.

**First**—Shut off the gasoline at the generator. This prevents flooding the engine.

**Second**—Shut off the spark by opening the switch.

**Third**—Shut off the lubricator.

**Fourth**—Drain the water out of reservoir (particularly in cold weather).

**Fifth**—If you have the engine outside or where it is liable to get wet, provide some covering that will protect it. It will be money well spent. Take good care of the engine and it will last a lifetime.

#### GASOLINE TANK.

##### Paragraph 6.

The gasoline tank is located in the base. It is made of galvanized iron. The 2-horse power engine holds 2½ gallons; 4-horse power, 4 gallons; 6-horse power, 5½ gallons; 8-horse power, 8½ gallons, and the 10-horse power, 11 gallons.

To fill the tank, remove the cap from the pipe located at the mouth of the cylinder and use the funnel furnished with the engine. Be sure the gasoline is clean and of the best grade. Some gasoline is diluted with water; water being heavier than gasoline it will stay on the bottom, and when you try to start the engine you will get water instead of gasoline and the engine won't run. Dirt in the gasoline will clog the mixing valve and stop the engine.

Always strain the gasoline through a chamois skin, which will prevent any dirt or water entering the tank, and you will have absolutely no trouble in this respect. There is a small hole in top of tank about the size a nail would make. This is a vent hole put there to allow an easy flow of gasoline. This may leak if you tip the engine while tank is full, but the hole should not be stopped up, as the engine will not work properly if this is done.

#### WATER RESERVOIR.

See 2 on page 5.

##### Paragraph 7.

Experience has shown that very little water is required to keep the temperature of a gasoline engine cylinder at the right point to

give the best results. Ninety-nine per cent of the gasoline engines used for farm purposes are now being manufactured with an open jacket or reservoir cooler. It is not only cheaper to manufacture, but is easier taken care of and gives better results.

Before starting the engine, fill the water reservoir with clean water to within 2 inches of the top. The cylinder is cooled by the water circulating around it. Always see that the reservoir is full of water. If it boils you need not be alarmed, as the temperature of the cylinder should be from 175 to 212 degrees Fahrenheit. Keep the cylinder properly lubricated and the reservoir full of water and there will be no danger of the engine overheating. **DRAIN THE RESERVOIR AT NIGHT TO PREVENT FREEZING.** In cold weather, fill the reservoir with hot water when starting, which warms the cylinder and enables you to start the engine much easier. We are not responsible for cylinders broken due to freezing.

#### BATTERIES.

##### Paragraph 8.

We furnish a set of six dry batteries in battery box with each Economy Gasoline Engine. Be sure the battery box is kept in a dry place. If you allow it to get wet the batteries will short circuit and run down.

Connect the battery wires to the igniter on the engine, turn on the switch and the engine is ready to run. When stopping the engine be sure to turn off the switch, otherwise the batteries will very soon run down.

All batteries are tested just before being placed in the box and must show 20 amperes or more, so that when they reach you they are in perfect condition. Test them frequently, however, to see that they are all right. If they show less than 7 amperes, replace them.

With proper care a set of batteries will last from four to six months. If not properly taken care of they may run down in a very short time.

We are not responsible for worn out batteries and cannot replace them. Batteries will wear out almost as quickly if allowed to stand idle as when in constant use.

If you buy a Stand-By Multiple Battery, as described on page 26, the batteries are put up in a wooden box all connected and covered with paraffin so that they are absolutely moisture proof and will last three or four times as long as the ordinary battery.

When it is necessary to replace a multiple battery you simply throw the old one away, box and all, and buy a new outfit. Never test a multiple battery with an ammeter, as the battery is very strong and will burn out the ammeter.

When starting the engine always be sure to turn on the batteries. This may seem a small



Ammeter for Testing Batteries.

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thing, but experience has shown that not only the novice, but the experienced gasoline engine man sometimes forgets to turn on the batteries, and the engine refuses to run.

#### HOW TO CONNECT A NEW SET OF BATTERIES.

##### Paragraph 9.

When the engine reaches you the batteries are properly connected and are ready to attach to the engine. If for any reason you change the batteries or coil, follow this diagram carefully to prevent trouble.

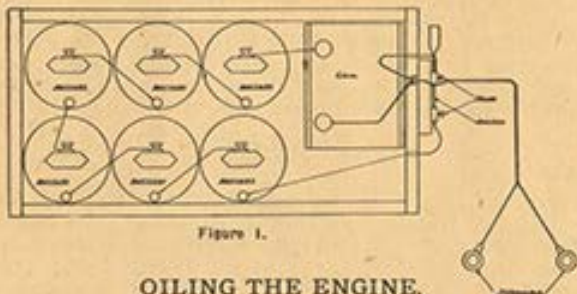


Figure 1.

#### OILING THE ENGINE.

##### Paragraph 10.

Be sure to use the best grade of gas engine oil in the lubricator (see No. 133 on page 23); nothing darker than a pale or golden color oil.

Be sure to oil all bearings as shown, No. 4 on page 5, also put a few drops of oil on the movable electrode of the igniter (a few drops is plenty, too much will cause trouble); also put a few drops on the valve stems. (See A and B, Figure 7 on page 15.)

Use a good grade of grease in cups and be sure it is clean (see No. 130 on page 23. We recommend the Economy Gasoline Engine Oil and Grease. (See prices on page 30.)

If a dark oil is used, a carbon deposit will form on the inside of the cylinder and on the igniter points, causing trouble. **Never use steam engine oil.**

Be sure all bearings are properly lubricated, as it will not only increase the life of the bearings, but will enable the engine to give much better results.

#### HOW TO ADJUST THE LUBRICATOR.

See No. 133 on page 23.

##### Paragraph 11.

To turn on the oil in lubricator, lift the lever or stem so that it will stand straight up. Turning the stem down shuts off the oil. **Be sure to turn on the oil when starting and turn off when stopping the engine.**

When you first get the engine, fill the lubricator and feed about fifteen to twenty drops a minute for ten days or two weeks, then reduce to about five to ten drops.

To change the number of drops per minute, screw the top adjusting screw up or down. When you have regulated the flow of oil and you are sure it is right, lock the adjusting screw by turning the thumbnut just below it.

#### LÜNKENHEIMER GENERATOR.

See 154 on page 22.

##### Paragraph 12.

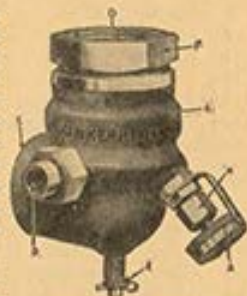
The generator or mixing valve is made to mix the air and gasoline to form a gas. This gas is sucked into the generator at "B" and to the cylinder at "D" by the piston. When in the cylinder it is compressed, and at the highest point of compression is ignited by the electric spark. This explodes the mixture, forces the piston out and makes the engine run. The proper running of the engine depends almost entirely on the proper mixture of the gasoline and air, so that it is very necessary that you understand the mixing valve thoroughly.

When you start the engine, open the throttle or numbered dial "A" about three-quarters of a turn (to No. 6 or No. 7), in cold weather a full turn and a half. This gives you a good mixture of gasoline. After the engine is running, the throttle should be closed until you get the best results. You can generally determine when the engine is running properly by the way it sounds. A little experimenting in this respect and you will soon know when the engine runs to the best advantage.

**If you feed too much gasoline,** black smoke will come from the exhaust; if you do not feed enough, the engine will not develop its full power and in time will shut down entirely. Not enough gasoline is generally indicated by a cough or choke and irregular running.

**Out of gasoline.** If the engine is running properly with the throttle set at the right point, and it starts to misfire, runs irregularly, coughs and chokes, the supply of gasoline in the tank has run too low for the engine to work properly. It is never advisable to allow the gasoline supply to run too low, as the engine will always give better results with the tank full than when nearly empty.

**To start in cold weather.** All gasoline engines will cause a little trouble in starting during cold weather. You can overcome this to a great extent by pouring hot water in the water reservoir, feeding more gasoline will also help you to start engine. To do this push up on the valve stem "E" on the bottom of the generator, or if this is not enough, tie a rag over the mouth of the air intake "C," shutting off some of the air, which will cause a greater suction on the gasoline when you start the engine. After the engine is running, take off the rag and regulate the throttle until you get the best results.



A—Gasoline throttle. B—Gasoline inlet pipe. C—Air intake. D—Passage to the cylinder. E—Valve stem. H—Packing nut.



**IGNITER.**

See 216 on page 22.

**Paragraph 13.**

The igniter is for the purpose of making the spark inside of the cylinder. It is of the make and break type. If properly adjusted this igniter will cause absolutely no trouble.

The igniter trip, as shown in the illustration, is caught by the igniter trip lever on the cam rod which brings the igniter points together, and when they are released the current jumps from one point to the other, making the spark.

The igniter is properly adjusted when the engine reaches you and no change should be necessary. If you find the spark does not occur in the right place, see page 11, which will give you full information as to what to do.

**Too much gasoline or oil.** If you feed too much gasoline or oil, or use a poor grade of either, a carbon deposit will form on the igniter points, and as electricity will not travel through carbon, it prevents the igniter from making a good spark. You should be very careful about the kind and amount of oil and gasoline you use.

**To remove a carbon deposit** on igniter points, caused by poor grade of oil or too much gasoline, remove the igniter by taking off the igniter bolts, clean the points with gasoline, emery cloth or a very fine file. These points should be round; do not file them to a point.

When putting the igniter back on remove the old packing so that both surfaces are smooth, use asbestos packing soaked in linseed oil. In case you cannot get linseed oil, use water, but be very careful you do not tear the packing. Screw the nuts down as far as possible with your fingers, then tighten them with the small wrench furnished with engine. Give each nut a half turn at a time until perfectly tight, and after engine has run for ten minutes tighten them again. It may be well for you to try these nuts frequently to see that they are tight, as they are apt to work loose from vibration.

**Don't allow the igniter to get wet,** or let it get dirty or greasy, as it will cause what is known as a short circuit and you will not get a spark inside the cylinder. A short circuit is where the electric current jumps across from one insulated point to another. Any conductor of electricity that gets between the two poles will cause a short circuit. If you do not get a spark inside the cylinder to explode the gas, the engine will not run.

**To find a short circuit,** remove the igniter, leave the battery wires attached to the two binding posts, snap the igniter by hand, and if there is no spark at the points, the igniter is short circuited. The only way to overcome this is to take it apart and clean it.

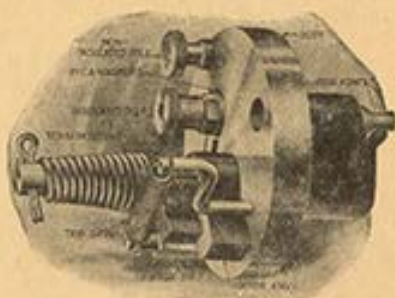


Figure 3.

To clean the igniter, take it apart carefully, being sure to see how each part is fitted so you can get it back together again. In cleaning the parts use kerosene or gasoline. It may be necessary for you to take the mica washers apart and clean between each one of them with gasoline or, better still, you can purchase extra washers. (See No. 11B66, page 35.)

After you have cleaned the igniter, put it back on according to the instructions given above. The spark that explodes the mixture inside the cylinder may not occur at just the right time and the engine will not run properly, or it may kick back when you try to start it. To see if the spark occurs at the right place or to reset it read paragraph 14.

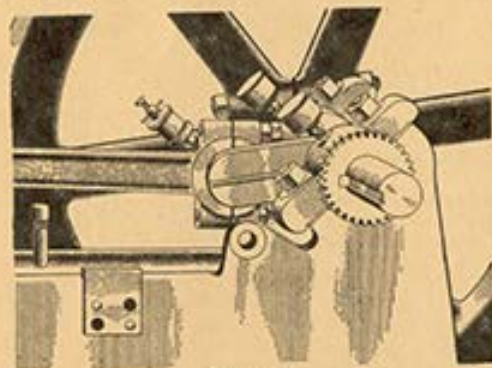
**WHEN THE SPARK SHOULD TAKE PLACE****Paragraph 14.**

Figure 4.

The electric spark at the igniter points inside the engine explodes the gasoline and gives the engine its power. It is very important that this spark occurs at the right place, as in this way you will get the most power with the least consumption of gasoline.

If the spark does not occur at the right point the engine will not develop its full power.

The time of the snap at the igniter is the time the spark takes place. If

you turn the fly wheels over slowly by hand and stop instantly when you hear the igniter snap, you can tell just where the spark takes place.

Figure 4 shows the position the crank shaft and connecting rod should be in on the 6, 8 and 10-horse power engines when the spark occurs. If it occurs at any point different from this you will not be getting the best results.

On the 2 and 4-horse power engines the crank shaft and connecting rod should stand just a little lower than shown in Figure 4.

The most of the trouble with a gasoline engine is caused by the spark. If you will watch this point carefully to be sure your engine always sparks as per the above instructions and that you get a spark inside the cylinder as well as on the outside, you will have very little trouble with your engine.



## GRINDING THE VALVES.

## Paragraph 24.

Figure 8 shows the method of grinding a valve that does not seat properly. Place the head of cylinder so that it is solid, put a screwdriver in the slot in the valve, put the valve in the valve seat and between the two surfaces put some emery dust and a little oil. If you cannot get emery dust, use pumice stone. Turn the valve to the right about six times and then to the left about six times and continue this operation until the valve and valve seat are both bright all the way around, as shown by the arrows. In replacing the valves be sure that you get the right springs on the right valves and that you don't get any dirt in them. The heavy spring is for the exhaust valve, and the light one for the intake valve. (See 74 and 75 on page 22.)



Figure 8.

## REPACKING THE CYLINDER HEAD.

See 14 on page 22.

## Paragraph 25.

When the cylinder head is put on we use asbestos packing between the cylinder head and cylinder to prevent the escape of the compressed gas.

To repack the cylinder head, in case the packing should blow out, use asbestos packing such as you can buy at your hardware store, or as furnished by us, as shown on page 36. Be sure both surfaces are perfectly smooth. Soak the packing in linseed oil. (If you cannot get linseed oil, use water, but be very careful that you do not tear the packing.)

After you have the packing in place, draw the head down close to the cylinder and screw on the nuts by hand as far as they will go, then use a wrench, being sure it is not too large, 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. After engine has been running about ten minutes, tighten the nuts again and you will have a perfectly tight joint. It is a good plan to try these nuts frequently, as they sometimes work loose from vibration.

## PISTON AND RINGS.

## Paragraph 26.



Figure 9.

To remove the piston from the cylinder, take off the connecting rod bolts at the crank shaft end and pull the piston straight out. It may not be necessary to remove it entirely,

as you can get it far enough out of the cylinder to inspect the rings. If it is necessary to remove it entirely, you will have to take off the governor balls on the 2-horse power engine. On the larger size engines this is not necessary.

After you have the piston entirely removed, if you find there is a carbon deposit on the rings and it is necessary to take them off, take three stiff pieces of tin and place under the rings at three different points. This will raise the rings to the edge of the piston and they can then be slipped off. Begin at the outer ring first. In replacing rings, simply reverse the operation.

## CRANK SHAFT.

See 122 on page 23.

## Paragraph 27.

The crank shaft is one of the most important parts of a gasoline engine, as the constant explosions in the cylinder throws the connecting rod out and there is considerable strain on the crank shaft.



Figure 10.

The shaft furnished with the Economy Engine is drop forged steel, the best we can buy. It is used on all high grade automobiles and if properly taken care of will last the life of the engine. The shaft is turned and ground to fit perfectly. The bearings will wear before the crank shaft and it is seldom necessary to replace the latter. Watch the crank shaft bearings, keep them tight, as loose bearings may break the crank shaft, and we are not responsible for breakage of this kind. Always be sure the pulleys fits up close to fly wheel.

## BEARINGS.

## Paragraph 28.

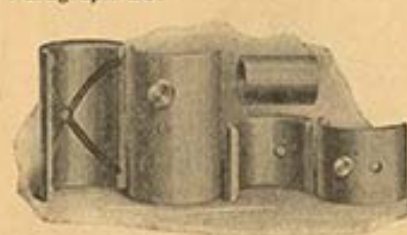


Figure 11.

We have made thorough tests of all the different bearings in use for gasoline engines and we find that a die cast babbitt bearing will give the most satisfactory service, causing the least trouble and expense. These die cast bearings are made so that they can be removed and new bearings put in their place. Liners or shims are used to take up the wear.



The crank shaft end of connecting rod has die cast babbitt bearings. The piston end has a cast bushing which is driven into the connecting rod. If it ever needs to be replaced it can simply be driven out and a new one driven in, so that all that is necessary to replace it is a hammer and chisel, or any small tool which will go through the opening in the connecting rod. If after putting in a new bushing the pin fits too tight scrape the bearing out a little with a knife.

Babbitt bearings are far superior to bronze bearings, as they require less lubricating oil or grease. Besides, if you happen to forget to oil the engine some day and the bearings run hot, if the engine has bronze bearings they will grind the crank shaft and the engine will need a new shaft. On the other hand, if the bearings run hot and they are made of babbitt, the bearings simply burn out, and all you need do is buy new bearings. It certainly is cheaper to buy new bearings than to buy a new crank shaft.

When the Economy Engines are shipped the bearings fit perfectly, but care should be taken that they do not jar loose from vibration, as a loose bearing will very soon cause trouble. It will cause pounding in the engine and should be fixed at once.

### How to Set Cam Gear for Opening the Exhaust.

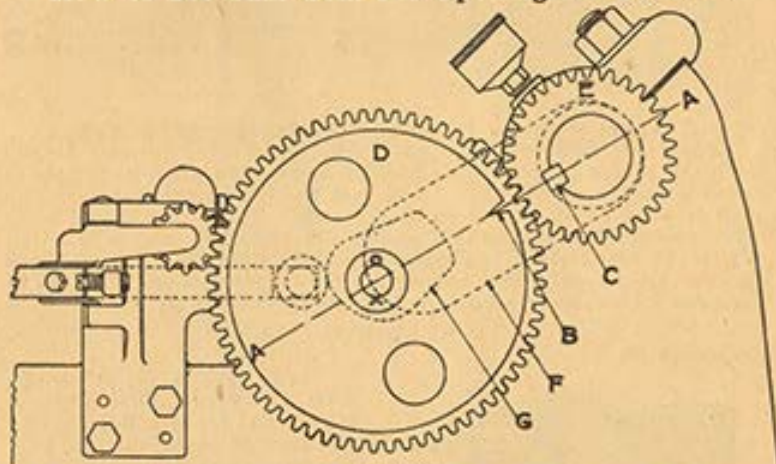


Figure 12.

B—Indicator on Cam Gear. C—Key Way in Crank Shaft Pinion. D—Cam Gear. E—Crank Shaft Pinion. F—Dotted line representing position of crank shaft when gear is properly set. G—Dotted line representing cam which controls exhaust valve and spark.

#### Paragraph 29.

The cam gear "D" in Figure 12 carries a cam on the other side, as shown by the dotted line "G." This cam opens and closes the exhaust and controls the spark, so that it is very important that it be

set just right. It is set properly when the engine reaches you, but if you ever have to take it off be sure to follow these instructions when putting it back on.

To set the cam gear, turn the fly wheels over so that the key way "C," Figure 12 on the crank shaft pinion "E" is just as shown. Then slip the cam gear "D" in place so that the teeth mesh and indicator "B" is in an exact line with the key way "C," then fasten the gear in place.

To be sure the gear is set properly, the exhaust valve "B" on page 15 should start to open at the end of the work stroke when the crank is in the position as shown in Figure 13 and should be closed at the end of the exhaust stroke when the crank stands as shown in Figure 4 page 11.

If you find the valve opens too early, take off the cam gear and turn it toward the crank shaft one tooth. This will make the exhaust valve open a little later and close a little later. If the valve does not open soon enough, turn the cam gear away from the crank shaft one tooth.

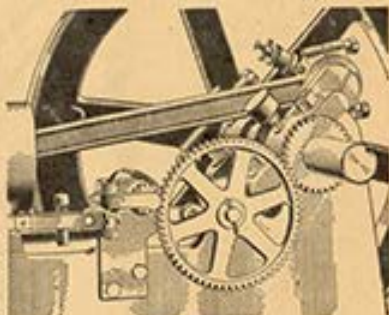


Figure 13.

### What to Do If Your Engine Fails to Run.

The Economy Gasoline Engine is very simple and should give you very little trouble. It is like every other machine, however, and sometimes gets out of adjustment. The most common causes of troubles are the **batteries** and **wiring**.

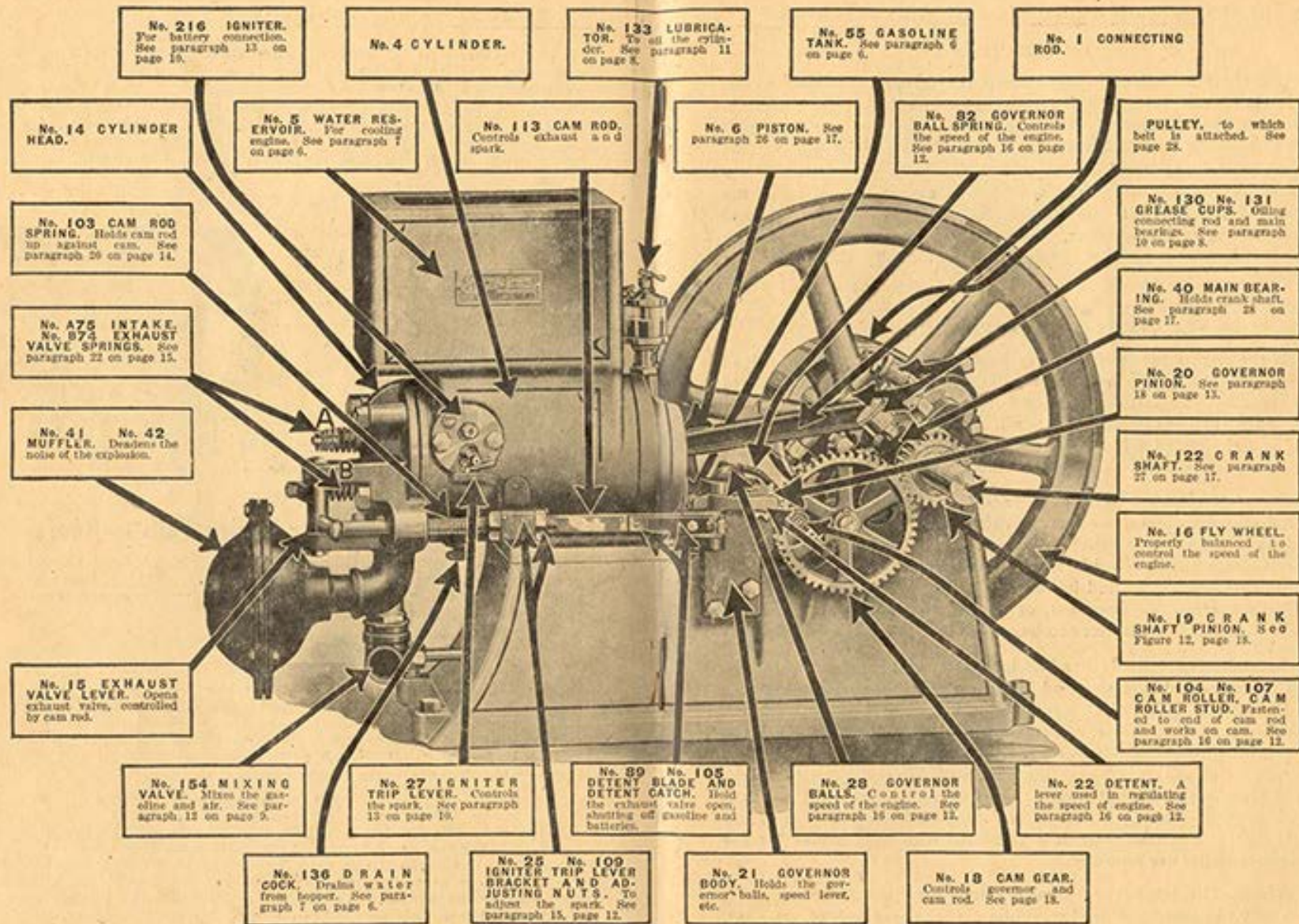
#### BATTERIES AND WIRING.

If the engine refuses to run, examine the batteries and see that they are properly connected and that the terminals are tight (see diagram on page 8). See that the switch works properly, that the spark coil is connected and that the wires connecting the batteries to the engine are not broken. Be careful that the wires do not get wet or soaked with oil, as this will cause a short circuit and you will not be able to get a spark at the igniter.

#### THE IGNITER.

Examine the igniter, see that it works freely, that it trips all right and that the spark comes at the right time (see page 11). Take the ends of the wires attached to the igniter, touch them together and see if you get a good spark. If you don't the trouble is with your batteries or the wiring. If the spark is all right, the trouble may be in the generator.







**GENERATOR.**

See that the valve through which the air passes works freely. Open the needle valve and tickle the generator by raising the stem at bottom of generator; if the gasoline drips, the feed is all right; if it does not drip, the tank may be empty or the pipe clogged. Test the gasoline for water; pour a little in the palm of your hand and hold for a few minutes; the gasoline will evaporate and leave the water. If you find water, drain tank and refill. **To prevent dirt and water getting in the gasoline**, strain through chamois skin. Dirt or water will cause irregular running and will finally shut down the engine.

**LOSS OF COMPRESSION.**

If the engine runs without very much energy, will not pull a load or furnishes very little power, the trouble may be caused by loss of compression. To test for loss of compression, turn the fly wheels over when the exhaust valve is closed. If you get considerable resistance and the cylinder holds the gas, the compression is all right. If the resistance is weak, there is something wrong.

**First**—If you use a poor grade or too much gasoline or lubricating oil it forms a carbon deposit around the rings, causing them to stick so they will not hold the compression. To remove this carbon deposit, clean the piston and rings thoroughly with kerosene and be careful of the gasoline and lubricating supply in the future. It may be that the rings are worn out, or one of them may be broken. If this is the case, you will have to buy new ones. (See 121 on page 37.)

**Second**—The cylinder head or igniter packing may be worn out. Test for loss of compression and listen for a hissing sound at cylinder head or igniter. To repack cylinder head or igniter, use packing as furnished according to list of extras in the back of the book; soak the packing in linseed oil. If you cannot secure linseed oil, use water, but be careful you do not tear the packing. After you put the packing in place screw the nuts down as far as you can by hand and then use a wrench. Turn the nuts a half turn each until they are perfectly tight. A special wrench is furnished with each engine for use on igniter bolts; use no other.

**Third**—The intake or exhaust valves may not close properly. They may be sooted and need regrinding. (See paragraph 24, page 16).

**THE IGNITER POINTS.**

If you have gone over all the above and still fail to get results and you get a spark at the igniter on the outside of the cylinder, it may be the trouble is with the igniter points. Remove the igniter, fasten the wires to the regular terminals and snap the igniter by hand. If you fail to get a spark, the igniter is short circuited, or the points are sooted. Clean points with kerosene or gasoline. If you find a short circuit, take the igniter apart and clean it thoroughly. (See Igniter, page 10.)

**RUNS IRREGULAR.**

If the engine, after having run satisfactorily, commences to misfire, runs irregularly, draws in gasoline several times before it explodes, coughing and choking, there is not enough gasoline in the tank to allow the engine to get the proper mixture. It is never advisable to allow the gasoline supply to run too low, as the engine will always give better results with the tank full than when it is nearly empty. If the engine kicks back when starting, the spark is advanced too far, so that it explodes the charge at the wrong time. To overcome this see paragraphs 14 and 15, pages 11 and 12.

**STUDY THE INSTRUCTION BOOK.**

Don't call in a gasoline engine expert to repair the engine. Study this Instruction Book carefully. If you are unable to find the trouble and can't overcome the difficulty, write us full particulars and we will advise you by return mail. The services of a so called gasoline engine expert will cost you money, besides you won't know any more about the engine after he is through than when he began, and he may leave the engine in a great deal worse condition than it was before. It may take you two or three hours to put the engine in good condition, but it will be time well spent and you will know how to overcome the same difficulty the next time.

**NOTE**—An engine will sometimes fail to furnish the best results on account of the pulleys not being of the right size, thus causing an overload. Read page 28 carefully, which will enable you to tell if you are using the right size pulleys. If you are not sure, write us.



## Base and Floor Plan for Economy Gasoline Engine and How to Make Concrete Foundation

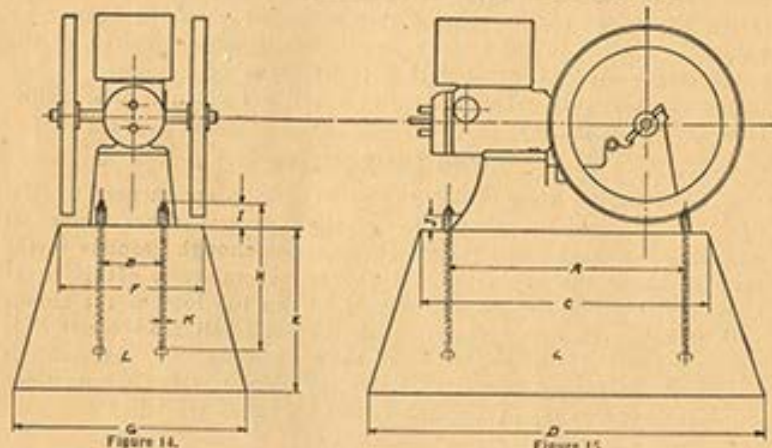


Figure 14.

Figure 15.

ENG.	A	B	C	D	E	F	G	H	J	K	WHEEL
2HP 249	7"	3 1/2"	4 1/2"	10"	16"	2 1/2"	15"	2 1/2"	12"	2"	1100
4HP 332	8"	4 1/2"	5 1/2"	12"	18"	3 1/2"	16"	3 1/2"	14"	2 1/2"	1200
6HP 364	9 1/2"	5 1/2"	6 1/2"	14"	20"	4 1/2"	18"	4 1/2"	16"	3"	1300
8HP 412	10 1/2"	6 1/2"	7 1/2"	16"	24"	5 1/2"	20"	5 1/2"	18"	3 1/2"	1400
10HP 462	12 1/2"	8 1/2"	9 1/2"	18"	28"	6 1/2"	24"	6 1/2"	20"	4"	1500

To build a concrete bed for your engine, dig a hole in the ground according to "D-G" on diagrams, in accordance with the size of the engine you purchase, and be sure that you dig far enough to go below the frost line. Then make a box without bottom to fit the hole. Be sure that the top of box is level, so that the foundation will be level.

In mixing the concrete, use one part cement, two parts sand and three parts crushed stone or gravel. Mix thoroughly when dry and use enough water to moisten the mixture until it is slushy. Pour into the box and tamp slowly until full. Before the concrete sets put four pieces of pipe or tin spouting where the bolts will come, placing the bolts in the pipe with an anchor on the bottom. This leaves the bolts movable to allow for variation of the holes in the engine base. After you have the pipes properly set, allow the concrete to set for several days until perfectly hard.

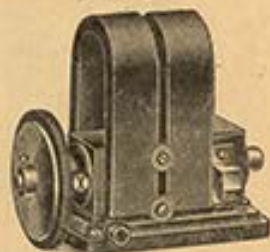
When you mount the engine, place your bolts in proper position and pour concrete into the pipe around the bolt; when this hardens the foundation will be perfectly solid. To determine just where bolts should set, make a frame by nailing two long strips and two cross strips together, fastening them to the outside frame. Lay out the base dimensions of the engine on this frame and bore a hole in the

four corners the size of the core hole in the case, running the bolts through these holes.

The 2-horse power engine has a 3/8-inch hole, the 4 and 6-horse power engines a 1/2-inch hole, and the 8 and 10-horse power engines a 5/8-inch hole.

### THE REMY MAGNETO.

A magneto is a small electrical generator designed especially for use with gasoline engines to furnish the spark. Batteries should be used to start the engine. When the engine is running at normal speed you change from the batteries to the magneto by using a two-point switch. This saves the batteries so they will last much longer than ordinarily, which cuts down the cost of ignition.



The Remy Magneto is well known all over the country, it is acknowledged as one of the best magnetos made. It is simple, durable, and we send full instructions with each magneto telling how to attach to the engine.

We highly recommend the purchase of the Remy Magneto and a Stand-By Multiple Battery for any gasoline engine, as they will give much better results and furnish satisfactory ignition for several years. The Remy Magneto will last indefinitely. For prices on multiple batteries see page 26.

When ordering be sure to give the size of the fly wheel and speed of your engine.

No. 11B4592 Remy Make and Break Magneto only. Price...\$7.95

No. 11B4593 Remy Make and Break Magneto with coil.  
Price ..... 9.20

Shipped from our factory in Southern Michigan.



## The Stand-By Multiple Battery

### For Gasoline Engines, Motor Boats and Automobiles

Moisture Proof, Can't Short Circuit, Perfect Ignition.



A regular set of dry batteries used to spark a gasoline engine, marine engine or automobile will last from three to five months, and you have to take very good care of them to get that length of service.

Here is a battery that will last three or four times as long; is absolutely waterproof, so requires no special care; will give a much hotter and stronger spark.

It consists of a set of ten batteries, wired in series, and put up in a wooden box covered with paraffin, which makes it absolutely waterproof. There are two binding posts on the top of the box for connections to the engine.

To show you how much superior this multiple battery is to the ordinary set of dry cells, we have only to take the results obtained on automobiles. An ordinary set of batteries will run a car 500 miles; this multiple battery will run it 5,000 miles. Equally as good results are obtained with gasoline engines.

We highly recommend the use of the Stand-By Multiple Battery with any gasoline engine, motor boat or automobile.

No. 11B256 Stand-By Multiple Battery. Weight, 70 pounds. Price .....\$4.00

No. 11B256A Stand-By Multiple Battery with make and brake spark coil and switch. Weight, 75 pounds. Price.....\$5.50

No. 11B256B Stand-By Multiple Battery with any of our engines in place of regular battery, add.....\$2.75



### ECONOMY BACK GEARED PUMP JACK.

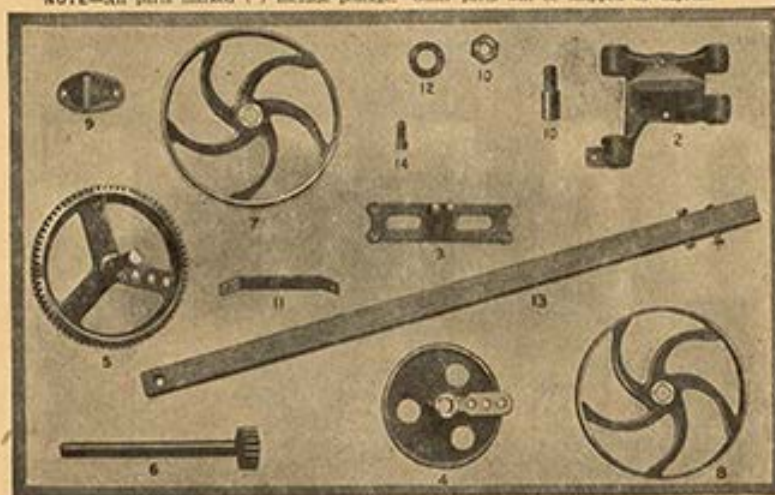
The Economy Back Geared Pump Jack may be used on any ordinary windmill, hand or force pump. It is back geared 4 to 1 and has three strokes: 5-inch, 7½-inch and 10-inch. It is furnished with tight and loose pulleys 13 inches in diameter for 2-inch belt, and should not be driven over 200 turns per minute. We recommend 160 turns, running pump about thirty-nine strokes per minute. A 2-inch belt is sufficient for raising water with a 3-inch cylinder on the 5-inch stroke 200 feet, on the 7½-inch stroke 150 feet and on the 10-inch stroke 100 feet. With a 2-inch cylinder this jack will handle a well 300 feet deep.

No. 11B4553 Economy Back Geared Pump Jack, complete. Weight, 80 pounds. Price.....\$5.25

### ECONOMY PUMP JACK REPAIRS.

Cat. No.	Item	Price	Cat. No.	Item	Price
11B2a	Main Base.....	\$1.30	*11B9	Clamp.....	60c
11B3a	Cross Head.....	.30	*11B10	Crank Pin & Nut.....	30c
11B4a	Crank Disc.....	.50	*11B11	Brace.....	25c
11B5a	Large Gear.....	.75	*11B12	Crank Pin Wshr.....	10c
11B6a	Small Gear.....	.75	*11B13	Pitman.....	50c
11B7a	Tight Pulley.....	.75	*11B14	Pulley Set Screw.....	10c
11B8a	Loose Pulley.....	.75			

NOTE—All parts marked (\*) include postage. Other parts will be shipped by express.





## REGULAR PULLEYS FOR ECONOMY GASOLINE ENGINES.

Drive pulleys for transmitting the power from the engine to the machine or the line shaft should be of a certain size to comply with the horse power of the engine in order to get the best results. Many purchasers of gasoline engines make a big mistake in ordering a small horse power engine with a large pulley, thinking they will get more power, but by using the wrong size pulleys they overload the engine and don't get the proper results. The pulleys furnished on the Economy Engines are standard and should not be changed unless absolutely necessary. For ordinary purposes a 2-inch belt will transmit all the power that a 2-horse power engine will develop; a 4-inch belt for the 4-horse power engine; a 6-inch belt for the 6, 8 or 10-horse power engines. High speed work, such as feed grinding, wood sawing, driving an emery wheel, etc., requires a large pulley to get the necessary speed. In such cases a large pulley should be used.



**NOTE**—For rules showing how to figure the size of pulley to use to get the best results, see the bottom of page 29.

## PRICES FOR CAST IRON PULLEYS.

Cat. No.	Size, Inches	Weight, Pounds	Price	Cat. No.	Size, Inches	Weight, Pounds	Price
11B4560	4x 4	9	\$0.80	11B4572	18x 6	40	\$2.75
11B4561	6x 4	10	.95	11B4573	18x12	60	4.00
11B4562	8x 4	13	1.20	11B4574	20x 6	47	3.15
11B4563	10x 4½	17	1.35	11B4575	20x 8	75	3.65
11B4564	12x 4½	19	1.50	11B4576	20x12	95	4.35
11B4565	12x 6	22	1.75	11B4577	22x 6	55	3.65
11B4566	14x 4½	31	1.90	11B4578	22x 8	65	4.25
11B4567	14x 6	36	2.00	11B4579	24x 8	90	4.75
11B4568	16x 4½	40	2.10	11B4580	26x 8	110	5.50
11B4569	16x 6	42	2.35	11B4581	28x 8	125	6.25
11B4570	16x 8	49	2.75	11B4582	30x 8	140	6.75
11B4571	16x10	50	3.00				

## FRICTION CLUTCH PULLEYS FOR ECONOMY GASOLINE ENGINES.

A great advantage is gained in using friction clutch pulleys on a gasoline engine:

**First**—Because in starting the engine you do not have to pull the full load when you are cranking.

**Second**—After you have started the engine you do not have to throw the belt on to the pulley. You can throw on the power by simply closing the clutch.

**Third**—You can start your machinery gradually, saving wear and tear on both engine and machinery.

**Fourth**—You can stop the machinery without stopping the engine.

**Fifth**—The prices of our Economy Friction Clutch Pulleys are so reasonable that no purchaser of an Economy Engine can afford to be without one.

## PRICES FOR FRICTION CLUTCH PULLEYS.

Cat. No.	Size, Inches	Weight, Pounds	Price	Cat. No.	Size, Inches	Weight, Pounds	Price
11B4519	8x4½	40	\$ 9.00	11B4527	16x6	100	\$14.00
11B4520	10x4½	50	9.50	11B4528	18x6	125	15.00
11B4521	10x6	50	10.00	11B4529	20x6	150	16.50
11B4522	12x4½	50	10.50	11B4530	22x6	175	17.50
11B4523	12x6	50	11.00	11B4531	24x6	200	18.50
11B4524	14x4½	60	11.50	11B4532	26x6	225	20.00
11B4525	14x6	75	12.00	11B4533	28x6	250	26.00
11B4526	16x4½	85	13.00	11B4534	30x6	275	28.00

## RULES FOR DETERMINING SIZE AND SPEED OF PULLEYS.

To determine the diameter of driving pulley, multiply the diameter of driven pulley by its number of revolutions per minute and divide the product by the number of revolutions per minute of the driver.

To determine the diameter of the driven pulley, multiply the diameter of the driver by its number of revolutions per minute and divide this product by the number of revolutions per minute of the driven.

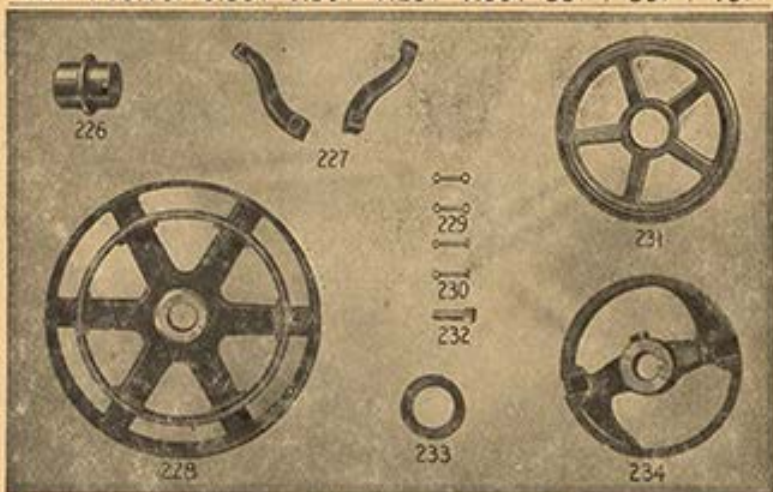
To determine the speed of the driver, multiply the diameter of the driven by its number of revolutions per minute and divide this product by the diameter of the driver.

To determine the speed of the driven pulley, multiply the diameter of the driving pulley by its number of revolutions per minute and divide the product by the diameter of the driven pulley.



## REPAIRS FOR FRICTION CLUTCH PULLEYS. PRICE LIST.

Sizes, Inches	No. 118228 Pulley	No. 118234 Friction	No. 118227 Dogs, Per Pair	No. 118231 Hand Wheel	No. 118226 Cam	No. 118229 and 118230 Screws, Each	No. 118233 Collar, Each	No. 118232 Set Screw, Each
8x4 1/2	\$ 1.60	\$3.10	\$1.30	\$1.25	\$1.00	30c	50c	10c
10x4 1/2	1.60	3.10	1.60	1.25	1.00	30c	50c	10c
10x6	2.30	3.10	1.60	1.25	1.00	30c	50c	10c
12x4 1/2	3.20	3.10	1.60	1.25	1.00	30c	50c	10c
12x6	3.50	3.20	1.60	1.25	1.00	30c	50c	10c
14x4 1/2	3.90	4.70	1.60	1.25	1.00	30c	50c	10c
14x6	4.70	5.10	1.60	1.25	1.00	30c	50c	10c
16x4 1/2	5.20	5.80	1.90	1.25	1.00	30c	50c	10c
16x6	6.20	6.80	1.90	1.25	1.00	30c	50c	10c
18x6	8.60	6.20	1.90	1.25	1.00	30c	50c	10c
20x6	10.10	6.50	1.90	1.25	1.00	30c	50c	10c



## ECONOMY GASOLINE ENGINE OIL.

(Shipped from our Chicago house.)

For lubricating cylinders and bearings of stationary and marine gasoline engines Economy Gasoline Engine Oil is the highest grade oil that can be produced. It can be excelled in lubricating qualities at any price. Do not experiment with cheap oils. Order a sufficient supply of Economy Gasoline Engine Oil and save repair bills.

No. 3083342 Economy Gasoline Engine Oil.	16-gallon can.	Price, per gallon.....	29c
	5-gallon can.	Price, per gallon.....	31c
	1-gallon can.	Price, per gallon.....	46c

## ECONOMY CUP GREASE.

A special high grade cup grease recommended for use in stationary, marine and automobile gasoline engines.

No. 3083392 Economy Cup Grease.	1-pound can.	Price.....	10.15
	5-pound can.	Price.....	.50
	25-pound can.	Price.....	2.00

REPAIRS

We will replace at any time any part of an Economy Gasoline Engine that gives out due to defect in material or workmanship, but we reserve the right to require the return of the defective part to our factory, charges prepaid, for inspection.

This guarantee does not cover parts giving out through natural wear and tear or parts broken due to carelessness.

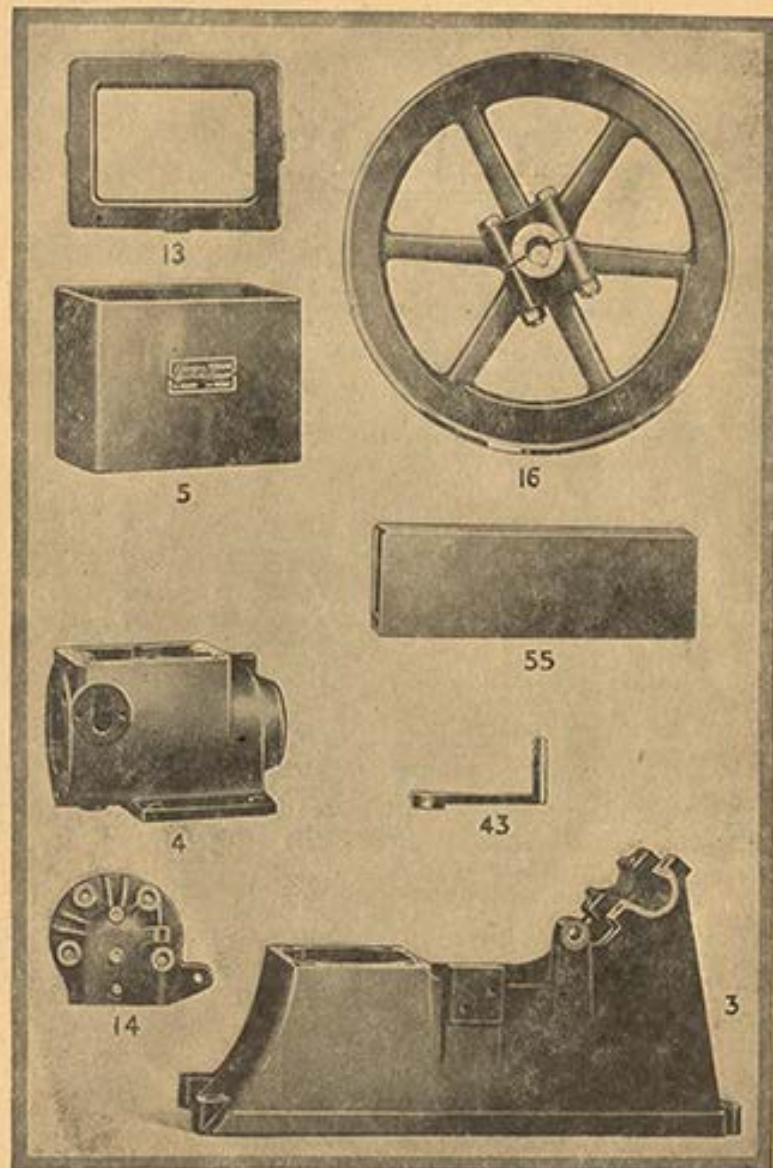
Never return any parts to us without first having taken the matter up with us. If you have any trouble, write and tell us all about it and we will take the matter up with you immediately.

Study this instruction book carefully, follow the advice that we have given and you will have no cause for complaint and will need very few repairs.



## REPAIR PARTS FOR ECONOMY GASOLINE ENGINES.

When sending for repairs be sure to give the number, name of part and horse power of your engine, and remit the price as quoted below opposite the name and number of the parts. If you do this there will be no mistake in filling your order.



Part No.	Name of Part	2-H. P.	4-H. P.	6-H. P.	8-H. P.	10-H. P.
11B1	Connecting Rod.....	\$ 3.25	\$ 3.60	\$ 4.50	\$ 5.00	\$ 5.50
11B2	Connecting Rod Cap..	.35	.40	.45	.50	.60
11B3	Base .....	11.27	13.23	19.60	25.97	31.85
11B4	Cylinder .....	6.86	8.26	9.59	18.62	22.05
11B5	Water Reservoir.....	2.94	3.36	4.20	5.04	7.14
11B6	Piston .....	2.20	2.40	4.00	5.05	7.75
*11B8	Igniter Body.....	1.00	1.00	1.00	1.00	1.00
11B9	Exhaust or Inlet Valve	.60	.60	.70	.90	1.10
*11B11	Main Bearings(2halves)	.90	1.20	1.35	2.10	2.50
*11B12	Connecting Rod Bearings (2 halves).....	.60	.90	1.05	1.50	1.60
11B13	Water Reservoir Lid..	.25	.30	.35	.40	.45
11B14	Cylinder Head.....	3.85	4.55	5.25	5.95	7.00
11B15	Exhaust Valve Lever.*	.40	*.40	.45	.45	.55
11B16	Fly Wheel.....	6.72	12.60	15.54	19.74	29.40
11B18	Cam Gear.....	2.00	2.25	3.00	3.30	3.60
11B19	Crank Shaft Pinion...*	.85	*.85	1.35	1.50	1.50
*11B20	Governor Pinion.....	.65	.65	.80	.80	.80
11B21	Governor Bracket.....	2.50	2.50	2.50	2.50	2.50
*11B22	Detent .....	.50	.50	.50	.50	.50
*11B25	Igniter Trip Bracket..	.75	.75	.75	.75	.75
*11B27	Igniter Trip Lever....	.50	.50	.50	.50	.50
*11B28	Governor Ball.....	.25	.25	.25	.25	.25
*11B30	Governor Spindle.....	1.00	1.00	1.00	1.00	1.00
*11B33	Movable Electrode....	.75	.75	.75	.75	.75
*11B34	Igniter Anvil.....	.30	.30	.30	.30	.30
*11B35	Igniter Trip.....	.35	.35	.35	.35	.35
*11B36	Valve Lever Adj. Screw	.12	.12	.12	.12	.12
11B40	Cap for Main Bearing.	.90	1.10	1.15	1.25	1.75
11B41	Muffler Cap.....	.40	.45	.50	.55	.60
11B42	Muffler Body.....	.45	.50	.55	.60	.65
11B43	Starting Crank.....	.45	.45	.55	.60	.60
11B44	Street Ell for Exhaust	.25	.30	.35	.40	.45
11B46	Gasoline Funnel.....	.10	.10	.10	.10	.10
*11B52	Connecting Nipple....	.25	.30	.35	.40	.45

\*All prices for parts that can be sent by mail include the postage.

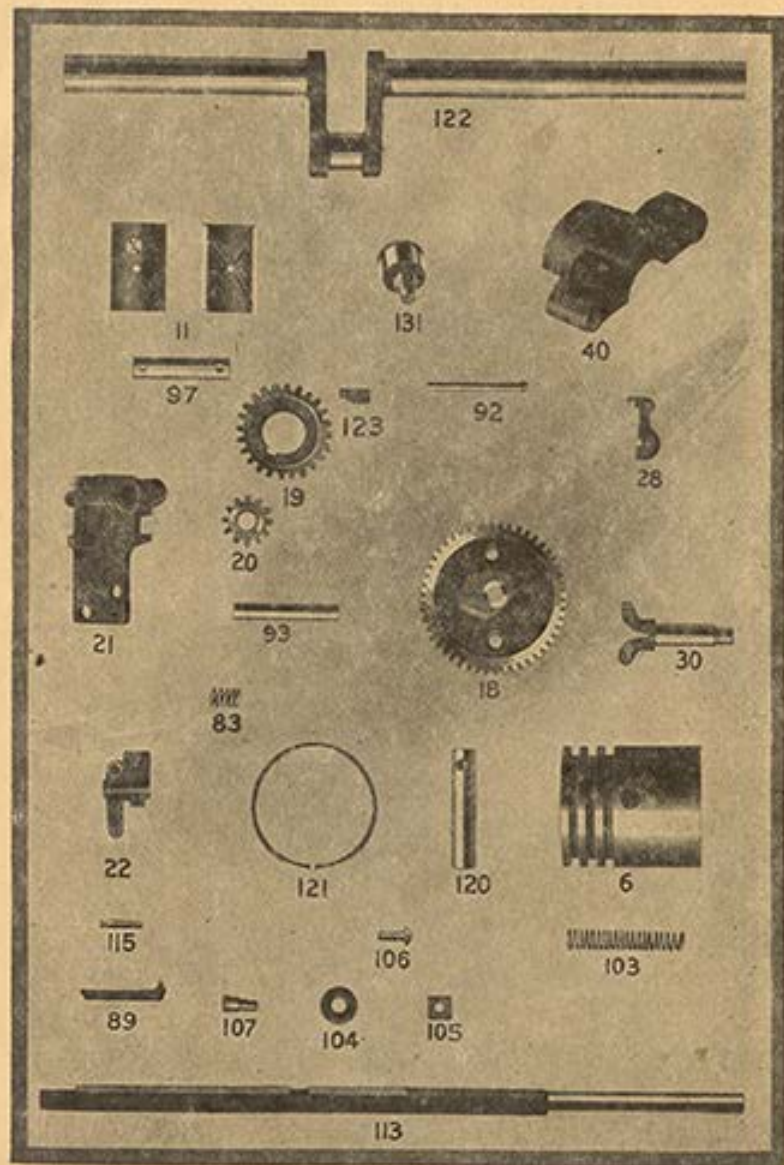


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Part No.	Name of Part	2-H. P.	4-H. P.	6-H. P.	8-H. P.	10-H. P.
11B55	Gasoline Tank .....	\$ 1.10	\$ 1.35	\$ 1.65	\$ 1.95	\$ 2.25
11B57	Gasoline Inlet Pipe....	.20	.20	.20	.20	.20
*11B58	3/4-Inch Pipe Cap for Fill Pipe.....	.10	.10	.10	.10	.10
*11B59	Igniter Trip Lever Bracket Plate.....	.25	.25	.25	.25	.25
*11B61	Cotter Pin for Igniter.	.05	.05	.05	.05	.05
*11B64	Igniter Stud.....	.08	.08	.08	.08	.08
*11B65	Igniter Anvil Stop Pin.	.10	.10	.10	.10	.10
*11B66	Mica Washers, one set..	.05	.05	.05	.05	.05
*11B67	Locknut for Insulated Electrode .....	.06	.06	.06	.06	.06
*11B68	Igniter Tension Spring	.10	.10	.10	.10	.10
*11B69	Igniter Trip Spring...	.10	.10	.10	.10	.10
*11B70	Binding Nut Insulated Electrode .....	.10	.10	.10	.10	.10
*11B71	Binding Nut Non- Insulated Electrode.	.10	.10	.10	.10	.10
*11B72	Igniter Packing.....	.15	.15	.15	.15	.15
*11B73	Stationary Electrode..	.50	.50	.50	.50	.50
*11B74	Exhaust Valve Spring.	.15	.15	.15	.15	.15
*11B75	Intake Valve Spring..	.10	.10	.10	.10	.10
*11B76	Exhaust Lever Stud..	.20	.20	.20	.20	.20
*11B78	Cylinder Head Stud...	.30	.30	.30	.30	.30
*11B79	Valve Cotter Pin.....	.03	.03	.03	.03	.03
*11B81	Cylinder Head Packing	.40	.40	.40	.60	.65
*11B82	Governor Ball Spring.	.10	.10	.10	.10	.10
*11B83	Speed Regulating Spring	.10	.10	.10	.10	.10
*11B84	Detent Spring.....	.10	.10	.10	.10	.10
*11B88	Cap Screw for Gov- ernor Bracket.....	.10	.10	.10	.10	.10
11B89	Detent Blade.....	.15	.15	.15	.15	.15
*11B90	Detent Blade Cap Screw	.10	.10	.10	.10	.10
*11B91	Gear Pin Set Screw..	.10	.10	.10	.10	.10
*11B92	Detent Pin.....	.15	.15	.15	.15	.15
*11B93	Governor Spindle.....	.12	.15	.18	.25	.30
*11B95	Igniter Trip Lever Bracket Plate Screw	.07	.07	.07	.07	.07
*11B97	Cam Gear Pin.....	.30	.30	.30	.30	.30

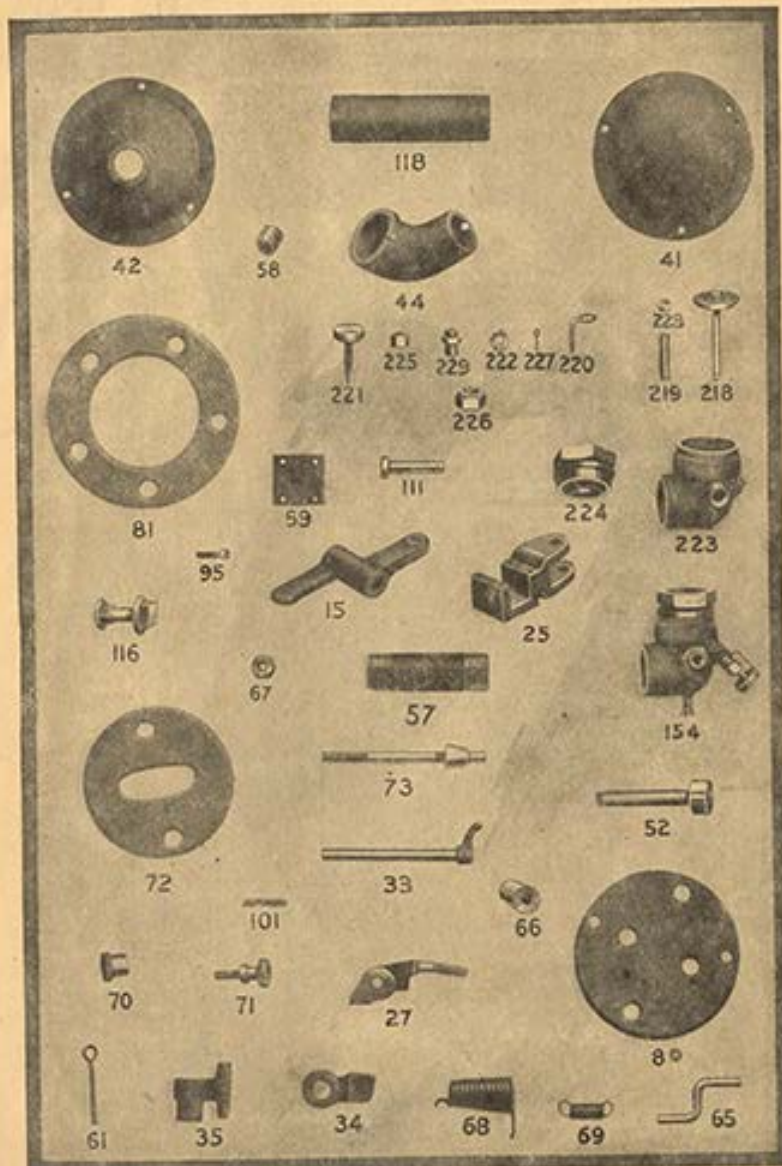
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## REPAIR PARTS FOR ECONOMY GASOLINE ENGINES.

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Part No.	Name of Part	2-H. P.	4-H. P.	6-H. P.	8-H. P.	10-H. P.
*11B98	Governor Ball Cotter Pin	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.03
*11B101	Igniter Trip Lever					
	Spring	.10	.10	.10	.10	.10
*11B103	Cam Rod Spring	.15	.15	.15	.15	.15
*11B104	Cam Roller	.25	.25	.25	.25	.25
*11B105	Detent Catch	.15	.15	.15	.15	.15
*11B106	Detent Catch Screw	.10	.10	.10	.10	.10
*11B107	Cam Roller Stud	.10	.10	.10	.10	.10
*11B108	Governor Bracket Pin	.03	.03	.03	.03	.03
11B109	Igniter Trip Bracket					
	Locknut	.05	.05	.05	.05	.05
*11B110	Locknut for Cam Roller	.06	.06	.06	.06	.06
*11B111	Igniter Trip Bracket					
	Bolt	.10	.10	.10	.10	.10
11B113	Cam Rod	1.25	1.35	1.40	1.60	1.80
*11B115	Detent Adjusting Screw	.12	.12	.12	.12	.12
*11B116	Reservoir Bolt and Washer	.15	.15	.15	.15	.15
11B118	Exhaust Pipe	.30	.35	.40	.45	.50
*11B119	Cylinder Cap Screw	.20	.20	.20	.20	.20
11B120	Piston Pin	.35	.45	.45	.45	.55
*11B121	Piston Ring	.55	.65	.75	.85	.95
11B122	Crank Shaft	5.25	7.00	9.50	11.25	16.50
*11B123	Crank Shaft Pinion Key	.10	.10	.10	.10	.10
*11B124	Key for Fly Wheel	.25	.25	.25	.25	.25
*11B125	Gasoline Tank Rods	.10	.10	.10	.10	.10
*11B126	Main Bearing Stud	.10	.10	.10	.10	.10
*11B127	Connecting Rod Stud	.10	.10	.10	.10	.10
*11B128	Set Screw for Piston Pin	.10	.10	.10	.10	.10
*11B130	Grease Cup, brass comp.	.40	.40	.60	.60	.60
*11B131	Grease Cup, brass auto.	.20	.20	.25	.25	.30
*11B132	Connecting Rod Bushing	.25	.35	.45	.55	.65
11B133	Cyl. Lubricator, brass	1.10	1.10	1.25	1.35	1.35
11B134	Lubricator Glass	.40	.40	.40	.40	.40
*11B136	Drain Cock	.20	.20	.20	.20	.20
11B140	Engine Oil. (See page 30.)					
11B141	Wrench	.40	.40	.40	.40	.40
*11B142	Oil Can	.20	.20	.20	.20	.20

\*All prices for parts that can be sent by mail include the postage.

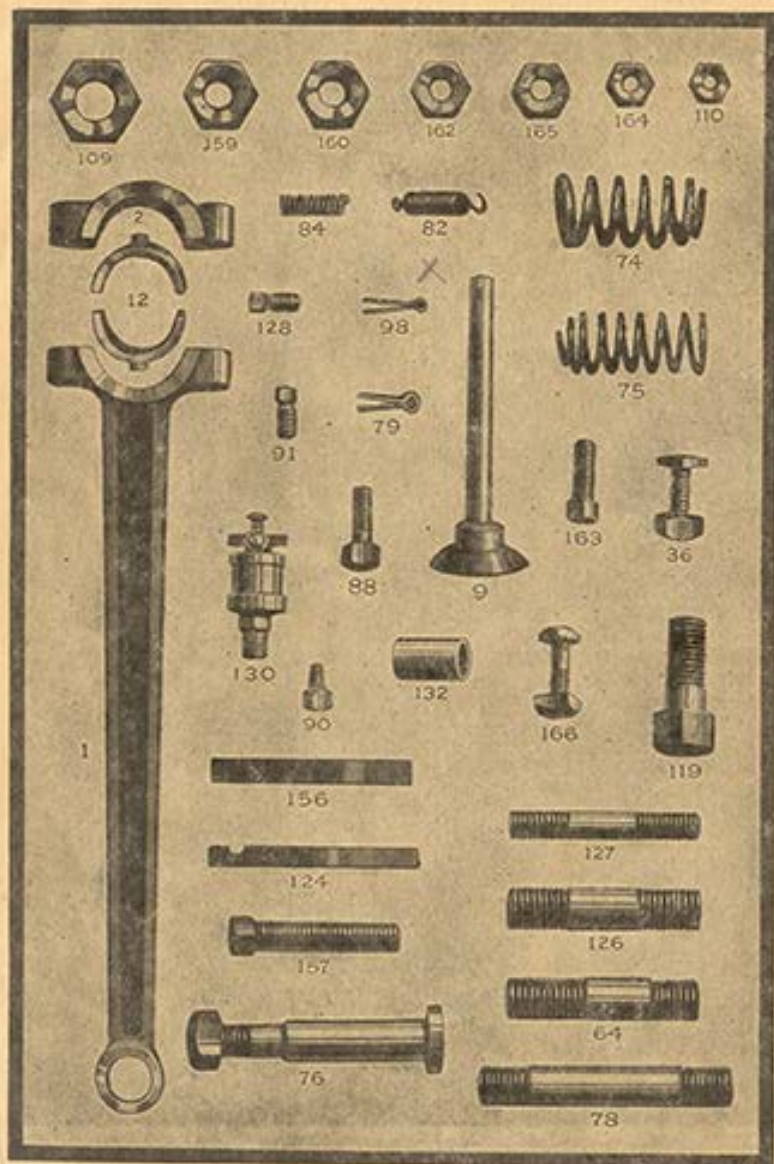


## REPAIR PARTS FOR ECONOMY GASOLINE ENGINES.

When sending for repairs be sure to give the number, name of part and horse power of your engine, and remit the price as quoted below opposite the name and number of the parts. If you do this there will be no mistake in filling your order.

Part No.	Name of Part	2-H. P.	4-H. P.	6-H. P.	8-H. P.	10-H. P.
11B144	Cup Grease. (See page 30.)					
*11B145	Combination Pliers.....	\$ 0.50	\$ 0.50	\$ 0.50	\$ 0.50	\$ 0.50
*11B152	Igniter Wrench.....	.30	.30	.30	.30	.30
11B154	Mixing Valve, complete	2.00	2.50	2.50	3.25	3.25
*11B156	Pulley Key.....	.18	.18	.30	.35	.35
*11B157	Pulley Set Screw.....	.05	.05	.05	.05	.05
*11B159	Main Bearing Stud Nut.	.10	.10	.10	.10	.10
*11B160	Cylinder Head Stud Nut	.10	.10	.10	.10	.10
*11B162	Connecting Rod Stud Nut	.10	.10	.10	.10	.10
*11B164	Igniter Stud Nut.....	.10	.10	.10	.10	.10
*11B165	Exhaust Lever Stud Nut	.05	.05	.05	.05	.05
*11B166	Muffler Bolt.....	.05	.05	.05	.05	.05
11B190	Dry Battery.....	.25	.25	.25	.25	.25
*11B191	Spark Coil.....	1.25	1.25	1.25	1.25	1.25
*11B192	Battery Connector, per set	.10	.10	.10	.10	.10
*11B193	Switch.....	.30	.30	.30	.30	.30
*11B195	Igniter Wire.....	.40	.40	.40	.40	.40
11B216	Igniter, complete.....	4.00	4.00	4.00	4.00	4.00
11B217	Battery Box, complete.	4.00	4.00	4.00	4.00	4.00
11B218	Valve.....	.45	.45	.45	.60	.75
*11B219	Valve Spring.....	.10	.10	.10	.10	.10
*11B220	Dial Pointer.....	.15	.15	.15	.15	.15
*11B221	Shut Off Dial.....	.35	.35	.35	.35	.35
*11B222	Thin Brass Nut.....	.08	.08	.08	.08	.08
*11B223	Carburetor Body.....	1.50	1.75	1.75	2.50	2.60
*11B224	Carburetor Body Cap.	.75	.90	.90	1.25	1.35
*11B225	Brass Packing Nut....	.25	.25	.25	.25	.25
11B226	Brass Union.....	.20	.25	.25	.35	.35
11B227	Cotter Pin.....	.05	.05	.05	.05	.05
11B228	Washer, Brass.....	.05	.05	.05	.05	.05
11B229	Brass Bushing.....	.18	.18	.18	.18	.18

\*All prices for parts that can be sent by mail include the postage.







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141



136



145



142



152



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193



191



192



134



144



217



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216



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