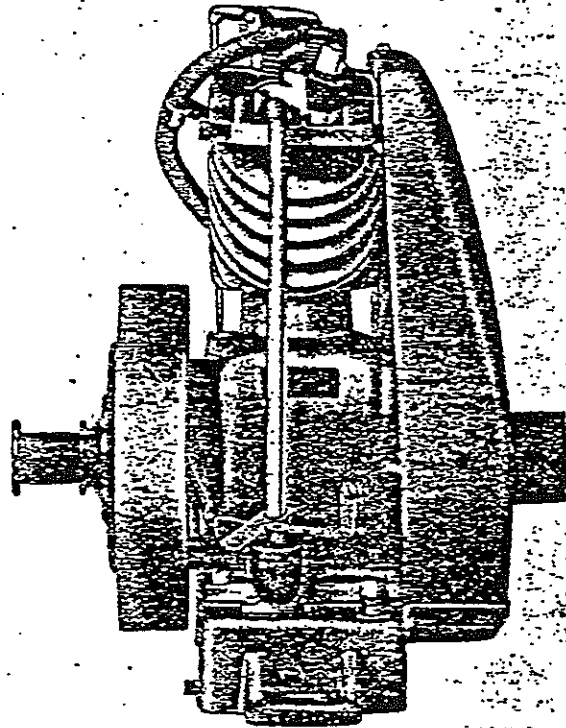


F, FB, FC

F, FB, FC

INSTRUCTIONS

How to Take Care of the
Full Power Briggs-Stratton Engine



**Briggs &
Stratton ©**
Milwaukee, Wisconsin

IMPORTANT SAFETY INFORMATION AND INSTRUCTIONS FOR ENGINE SELECTION ENGINE INSTALLATION ENGINE OPERATION

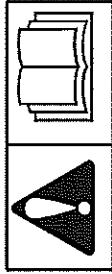
In the USA and Canada,
our 24-hour hotline is

18002333723

Briggs & Stratton Corporation
Milwaukee, Wisconsin 53201

www.briggsandstratton.com

Keep these instructions for future reference.




Before installing and operating this engine read and observe all warnings, cautions and instructions on both sides of this sheet, on the engine, and in the operating & maintenance instructions.


NOTE: This sheet of instructions and safety information is not meant to cover all possible conditions and situations that may occur. Read entire Operating & Maintenance Instructions for this engine AND the instructions for the equipment this engine powers. Failure to follow instructions and safety information could result in serious injury or death.

The safety alert symbol () is used to identify safety information about hazards that can result in personal injury.

A signal word (DANGER, WARNING, or CAUTION) is used with the alert symbol to indicate the likelihood and the potential severity of injury. In addition, a hazard symbol may be used to represent the type of hazard.

 **DANGER** indicates a hazard which, if not avoided, will result in **death or serious injury**.

 **WARNING** indicates a hazard which, if not avoided, could result in **death or serious injury**.

 **CAUTION** indicates a hazard which, if not avoided, might result in **minor or moderate injury**.

CAUTION, when used **without** the alert symbol, indicates a situation that **could result in damage to the engine**.

HAZARD SYMBOLS AND MEANINGS



Fire



Explosion



Moving Parts



Toxic Fumes



Hot Surface



Shock



Kickback



ENGINE SELECTION

	WARNING
	
Failure to select the correct engine could result in fire or explosion.	



- Some engines are unique and designed for specific applications or types of equipment. If this engine will be used to build new equipment, contact Briggs & Stratton to ensure that the engine is appropriate for the intended use.
- **Note: For all Go-karts use only a model 136200 series engine, which offers improved safety and performance.** Replacement engines should be the same model as the original engine, or be the Briggs & Stratton designated replacement engine. Refer to the Operation & Maintenance Instructions for engine identification information.
- **Note: For all Go-karts use only a model 136200 series engine, which offers improved safety and performance.** Do not use Briggs & Stratton engines on 3-wheel All-Terrain Vehicles (ATVs), motor bikes, air craft products, or vehicles intended for use in competitive events. Briggs & Stratton does not approve or authorize such uses.

ENGINE INSTALLATION



- [1] Do not attempt to install this engine if you do not have the appropriate tools and knowledge of small engine installation procedures. Use only Briggs & Stratton parts. Contact your Authorized Service Dealer for assistance.
- [2] Do not modify the engine in any way without Briggs & Stratton factory approval. Any such modification is at the owner's sole risk.
- [3] If the exhaust system on the old engine was supplied by the equipment manufacturer, you must transfer the exhaust system and related components (original muffler and related pipes, brackets, clamps, and shields) to the new engine. All components must be in good condition.
- [4]

	WARNING
	

 Install muffler (and muffler deflector if used) so outlet points away from operator, fuel tank, and equipment, and so muffler heat will not damage or deform engine and components.
- [5]

	WARNING
	

 Ensure all fuel lines and fittings are properly assembled and do not leak. Replacement parts must be the same model as the original.
- [6]

	WARNING
	

 Ensure all wiring, including safety switches and engine shut-off components are completely installed and functioning properly.
- [7] Set engine speed to equipment manufacturer's specification. Refer to equipment manufacturer's manual. Do not tamper with governor springs, or other parts that will increase engine speed above specification.

[8]

	WARNING
	

All engine parts, including fuel cap, spark plug, muffler, air cleaner, and covers and guards for drive components (gears, belts, shafts, couplings, etc.) must be in place before attempting to start engine.

[9]

	WARNING
	

If engine is installed on walk behind lawn mower, all mower components, including cutting blade, must be correctly installed before attempting to start engine.

[10]

	WARNING
	


When working on the engine or equipment, remove spark plug wire from spark plug. For electric start, remove negative wire from battery.


[11]


	WARNING
	

Do not check for spark with spark plug removed. Use Briggs & Stratton spark tester #19368.

ENGINE OPERATION

	WARNING
When adding fuel:	
Turn engine off and let engine cool at least 2 minutes before removing gas cap.	
Fill fuel tank outdoors or in well-ventilated area. Fill tank to about 1 inch below lowest portion of neck to allow for fuel expansion.	
Keep gasoline away from sparks, open flames, pilot lights, heat, and other ignition sources.	

	WARNING
When starting engine:	
Remove all external equipment/engine loads.	
Wait until spilled fuel is evaporated. Start engine outdoors.	
Pull cord slowly until resistance is felt, then pull rapidly.	
If engine floods, set choke to OPEN/RUN, place throttle in FAST and crank until engine starts.	

	WARNING
When operating equipment:	
Do not tip engine or equipment at angle which causes gasoline to spill.	
Run engine outdoors. Do not run in enclosed area, even if doors or windows are open.	
Do not choke carburetor to stop engine.	

Read and Follow Instructions Carefully

Our Service and Sales are two different departments. Therefore, when communicating with us, keep Service subjects separate from Sales subjects.

When desiring additional information, or returning material, or placing order for parts, address letter for the attention of the Service Department. Never address a letter to an individual, as this may cause some delay.

This booklet covers the Full Power engine which has been made in three types—Type F, Type FB and Type FC. In following the instructions and in ordering parts be sure to note particularly whether data in question applies to the particular type which you have. When not otherwise specified the information in this booklet applies equally to all three types.

The engine number is placed either on the rim of the fly wheel or on the crank case on rear side of the engine, above and slightly to the left of the breather tube. This engine number is preceded by the type letter.

In ordering parts or writing to us about this engine always be sure to give us not only the engine number but the type letters also.

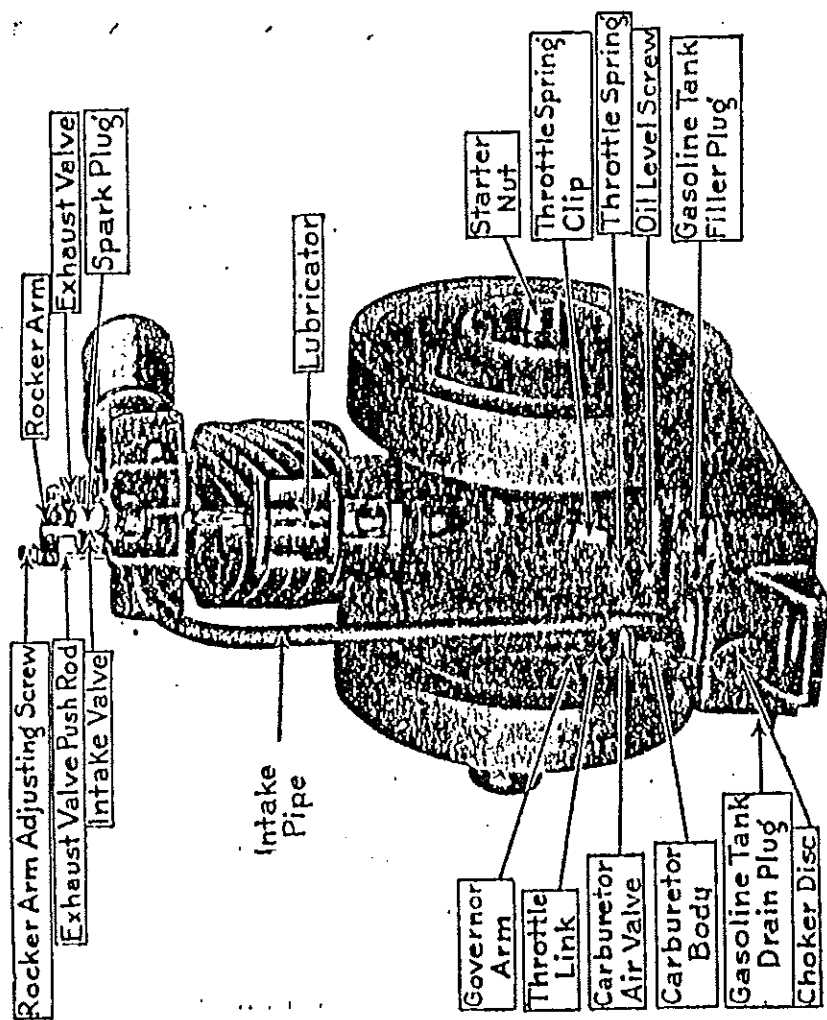


FIGURE 1—Model F Engine

INSTRUCTIONS FOR USE OF "FULLPOWER" ENGINE

A gasoline engine, properly designed and constructed will run efficiently if properly fed and taken care of. Every engine is carefully inspected and given a thorough running test before being shipped. While there are but few working parts to this engine, it should be remembered that it is not a perpetual motion machine. It will not run by itself, but requires gasoline, air, oil and some care. When everything is properly adjusted, the engine will run properly, but it is just as certain that if it is neglected it will not run satisfactorily, if at all. When the engine does not run, do not blame the engine. Simply ask, "What have I neglected? Who has been meddling with my engine?" Look for the trouble. The engine was made to run: it has run, and it will run again if allowed to do so.

If you expect to have a good working engine you should give it some care. Keep it free from dust and dirt. As often as may be necessary, wipe off any oil or dirt that has accumulated on the engine; when not in use, keep the choker disc in place on the carburetor to prevent dust settling in the carburetor. A cover large enough to cover engine will do much to preserve the outfit. A little care, such as any machinery requires, given at frequent intervals, will insure satisfactory results and many years of service without repair bills. In the following pages we have endeavored to give sufficient information so that you should be able to take care of any ordinary trouble yourself.

The Fullpower Engine operates on what is known as the four cycle or four-stroke principle, the same as practically all automobile and stationary engines. The four cycles can be explained as follows: It requires four strokes of the piston to produce one power stroke.

First Cycle or Suction Stroke: The piston moves down in the cylinder when exhaust valve is closed. The suction thus produced opens the intake valve and a charge of gasoline mixed with a proper proportion of air is drawn into the cylinder. This mixture quickly forms a gas when the engine is hot. When the piston reaches the bottom of the cylinder and there is no more suction the spring on the intake valve closes it.

Second Cycle or Compression Stroke: The piston now makes the up or compression stroke. Both valves being closed, you will readily see that the charge of gas must be compressed into the small space in upper end of cylinder when the piston reaches the upper end of its stroke.

Third Cycle or Power Stroke: An instant before the piston reaches the end of its second stroke the timer breaks a contact in the ignition circuit, and this causes a spark to leap across the points of the spark plug. This ignites the compressed gas, which in burning expands so rapidly as to cause the

term "explosion" to be used when describing this operation. It takes an instant for all the gas to ignite, and the spark is so timed that by the time all the gas is burning the piston has passed the upper end of the stroke and started down again. The rapid expansion of the burning gas pushes the piston down, forming the power stroke.

Fourth Cycle or Exhaust Stroke: When the piston reaches the bottom of the power stroke the exhaust valve is opened by the push rod and the piston in moving up forces all the burnt gases out of the cylinder. At the top of the exhaust stroke the exhaust valve closes and the first cycle or suction stroke, takes place again, followed by the other strokes as described.

All the cycles or strokes take place more rapidly than they can be described, but we believe that this explanation of the operation of the engine will help you understand it better and thus enable you to keep it in perfect running order.

INSPECTION

Examine spark plug to see that it is screwed in place and is not cracked or broken. See that ignition cable terminal is securely fastened to spark plug. Depress intake valve several times. It should snap up freely when released.

Revolve fly wheel several times and watch exhaust valve stem, rocker arm and pushrod. These should work freely once every second revolution of flywheel. When exhaust valve is seated, or up, there should be a space between the exhaust valve stem and rocker arm, of about double the thickness of a piece of newspaper.

On the Model FB and Model FC engines the rocker arm is made of hard bronze, and if the space between the exhaust valve stem and rocker arm is not as outlined above, the adjustment is made on the rocker arm fork or "yoke". Revolve fly wheel until valve push rod and end of rocker arm are in lowest position. Loosen set screw holding rocker arm fork in place, raise rocker arm and fork and insert two thicknesses of newspaper between the valve stem and rocker arm. Lower rocker arm and fork gently until one end of rocker arm rests on paper on valve stem and other end of rocker arm is seated on valve push rod. Then securely tighten set screw holding rocker arm fork in place and your valve adjustment is properly made.

On the Model F engine if the adjustment of the space between the exhaust valve stem and rocker arm is not correct as explained, the adjustment is made by means of the adjusting screw on the opposite end of the rocker arm. First loosen lock nut and then turn the adjusting screw to the left or up if the space is too small, or turn to the right or down if space is too great. After testing out adjustment with double thickness of newspaper, be sure to tighten lock nut.

FILLING

Gasoline tank is in the base of the engine and is filled through opening in top of base after removing gasoline tank filler plug. Examine filler plug to see that small vent hole is clear and fill tank with a good grade of gasoline. Replace plug.

On Model FB and FC engines the oil filler opening is on the side of the engine opposite the carburetor as shown in figure 9. With the engine setting level pour oil in this opening until it overflows. This is the maximum oil level. Replace filler plug. We recommend the use of Mobiloil A, which we have found by test to be of the proper characteristics for all conditions except outdoor use in winter weather when we recommend Mobiloil Arctic. These oils may be obtained almost anywhere.

On the Model F engine the oil cup illustrated in figure 2 should be unscrewed and also the oil level screw located to the right of the carburetor. (See figure 1). Pour the best grade medium cylinder oil (we recommend Mobiloil A) into the oil cup opening until oil begins to overflow at the oil level hole. Replace oil cup and oil level screw. See that shut off lever (No. 1—Figure 2) is in a horizontal or "off" position and then fill oil cup with oil. Then raise the shut off lever to the vertical or "on" position and turn the adjusting nut (No. 2—Figure 2) to the right to reduce or to the left to increase, until the oil drips through the sight feed (No. 5—Figure 2) at the rate of 8 to 10 drops per minute (10 to 12 drops while engine is new). Keep lever shut off except when engine is running.

LUBRICATING SYSTEM

TYPE FB AND TYPE FC—In the type FB and FC engines there are two systems of lubrication used, both of which are entirely automatic. In one system a small oil pump is employed to keep the proper level of oil and in the other a specially constructed gravity feed oil trough. A splasher on the lower end of the connecting rod dipping into the oil trough splashes the oil in the form of fine spray through out the cylinder and the crank case, thoroughly lubricating all moving parts.

After filling the oil reservoir thru the oil filler opening as directed above, no further attention is necessary except to examine the oil level as indicated by the height of the oil in the oil filler pipe every few running hours. The oil reservoir shall always be at least half full. **ONCE EVERY 50 RUNNING HOURS DRAIN THE OLD OIL OUT OF THE OIL RESERVOIR BY TIPPING THE ENGINE AND POURING THE OIL OUT OF**

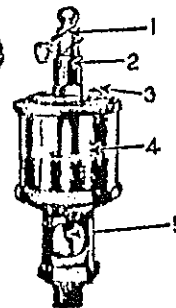


Figure 2

THE OIL FILLER HOLE. THE OIL SHOULD THEN BE REPLACED BY NEW OIL.

TYPE F—In the Type F engine, lubrication is accomplished by the splash on the lower end of the connecting rod dipping into the oil in the oil reservoir and splashing the oil in fine spray throughout the cylinder and crank case. This oil level must be maintained constantly to secure proper lubrication and the oil cup as illustrated in figure 2 is therefore provided. Adjust the adjusting nut (No. 2—Figure 2) so that oil drips through the sight feed (No. 5—Figure 2) at the rate of 8 to 10 drops per minute. Be sure to shut off the shut off lever when stopping the engine.

It is well to frequently check up on the flow of oil by removing the oil level screw. On removing this screw oil should always run out. If it does not do so it is necessary to pour in enough fresh oil to bring it up to this level and the adjustment nut on the oil cup adjusted to give a greater flow of oil. It is advisable occasionally to check the flow of oil as when the oil is cold a greater opening will be required than when the oil is warm to get the same rate of flow of oil.

ONCE EVERY 50 RUNNING HOURS DRAIN THE OLD OIL OUT OF THE OIL RESERVOIR BY REMOVING THE OIL LEVEL SCREW AND TIPPING THE ENGINE SO THAT THE OIL WILL RUN OUT. THE OIL SHOULD THEN BE REPLACED BY NEW OIL.

STARTING

First make sure that oil level is correct as described above and in the case of a Type F engine open the oil shut off lever on the oil cup. Make sure that the gasoline tank is supplied with plenty of gasoline.

Then place the choker disc over the top of the carburetor. This disc is either fastened to the side of the carburetor by a small chain or it is an oblong disc fastened to the gas pipe which can be swung around to partially cover up the hole in the top of the carburetor. This shuts off considerable of the air supply, giving a very rich mixture necessary when starting a cold engine. When the engine is hot it is not necessary to choke the carburetor.

Some few engines were equipped with priming cups. A teaspoonful of gasoline in the priming cup in very cold weather may assist in starting. Be very careful not to use more than one teaspoonful.

Slip the knot of the starter cord into the V of the starter pulley and wind all the cord on the pulley snugly, winding in a clockwise direction when facing the engine from the starter pulley side. Grasp the cord and give it a

fast hard pull so as to spin the engine. The cord will become disengaged from the starter pulley at the end of the pulling stroke. If the engine is cold it may be necessary to repeat this operation two or three times. When engine has started remove choker disc. If the engine is cold it may begin to slow down, or sputter, immediately after starting. In this case replace choker disc until engine picks up and then remove it. The engine will warm up in a few seconds. If engine does not start, the trouble is lack of gasoline, ignition or compression.

(If engine is equipped with ground switch see that switch is open before starting. This switch operates opposite to switch on battery type ignition and is used to stop the engine by grounding or short-circuiting magneto.)

GASOLINE—Be sure that there is a sufficient quantity of gasoline in the tank and that the vent hole in the gasoline filler plug is not clogged up. This prevents the gas from flowing freely. Although the carburetor is adjusted at the factory and should not require any adjustment, at high altitudes and with certain grades of gasoline a slight adjustment of the screw in the side of the carburetor top may be desirable. Turning this screw (provided on Type FB and FC carburetors) inward reduces the air opening making the mixture richer and turning it outward makes the mixture leaner.

IGNITION: If engine fails to start, remove ignition cable from spark plug and remove spark plug. See that points are clean and about 1/16" apart. This will be about the thickness of a thin dime. Attach ignition cable firmly to spark plug and lay spark plug on top of engine so that steel part of plug is touching engine. Grasp ignition cable by the insulation and keep a point during each revolution a spark should jump across the gap in spark plug providing spark plug is laid so that steel part is touching engine. If there is no spark the probabilities are that the spark plug is cracked or porous. Replace with a plug of reputable manufacture that you know has been tested and is O. K.

CAUTION: Never in any case try to test for spark by removing ignition cable from spark plug, trying to hold terminal of cable close to cylinder revolving flywheel and watching for spark between ignition cable terminal and cylinder. You run an excellent chance of completely ruining your magneto if you test in this manner.

If there is still no spark remove nut from end of crankshaft that holds magneto flywheel in place. Pulling outward on the flywheel, tap the end of crankshaft gently with a piece of wood, brass or lead. Do not strike end of crankshaft with hammer or other hard substance as you will ruin the threads. This gentle tapping will loosen flywheel from its taper seat and it will come

of the crankshaft. You will then have exposed to view the breaker arm 13MD. See Figure 7 for the view of magneto. You will note that the breaker arm is pivoted in the center, with one end riding on the crankshaft. On the other end is located a tungsten point with another located opposite it. You may find that there is oil or foreign substance between these points or they may be burned. (Note: The latter only after an engine has been used.) If found to be dirty, clean well with a piece of fine sand paper. If the points are rough scrape them with a sharp knife, but under no condition use emery cloth. When the points are separated the greatest, the gap should be about .006 of an inch. Use two thicknesses of newspaper as a gauge.

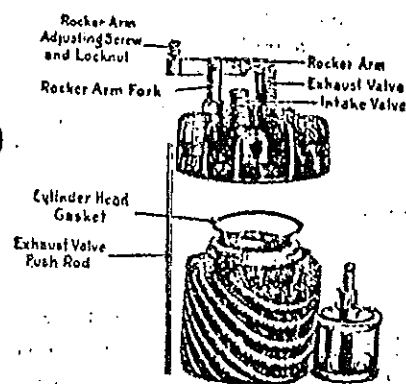
Another important matter to watch is the proper fastening of the magneto cable which reaches from the connection on the coil to the spark plug. This cable should be securely fastened at both the coil and the spark plug. Fasten the cable to the coil connection with a pair of pliers. Under no circumstances is the cable to be soldered to the coil. Any heat will damage the winding. To insure the cable not coming loose at the coil, secure with the clamp just to the left of the points. This will insure a good connection even though the cable is jerked. The insulation of the coil and cable must not be cracked or oil soaked. Replace flywheel carefully and try as before. If still no spark develops there is something wrong that you cannot remedy and the engine must be returned to the factory.

If, on finding that you have gasoline and a spark at the spark plug, when the flywheel is revolved, then there is but one thing that you can look for.

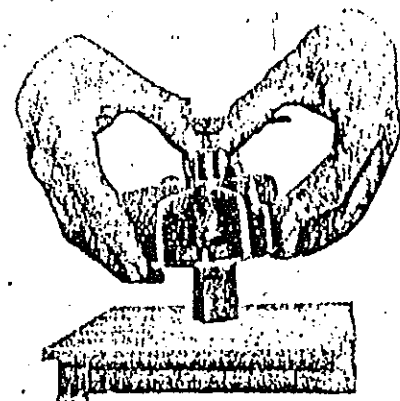
LACK OF COMPRESSION—The mixture of gasoline from the carburetor must be compressed on the up stroke of the piston and in this condition "touched off" or "fired" by the spark jumping across the gap in the spark plug. If this compression does not take place there will not be an explosion of gas, and consequently the engine will not run. There are but four reasons which you can ascertain and remedy. They are: Intake valve not seating properly, exhaust valve not seating properly, spark plug loose or cylinder head loose.

To determine if you have compression, revolve flywheel at a moderate speed by hand. If you have compression there will be a point during every second revolution where you will meet a resistance. It will feel as though you were pulling against a spring, and if you revolve the flywheel up to this point of resistance fairly fast and let it go it will rebound rapidly in the opposite direction. If this action does not take place there is no compression and you must look for the cause. First see that screws in cylinder head are drawn down tightly. If there is still no compression, examine springs on

both intake and exhaust valve and make sure that they are not broken. Depress intake valve several times. It should snap up freely. Revolve flywheel by hand and see that rocker arm depresses exhaust valve once in every second revolution. When exhaust valve is up see that there is clearance between rocker arm and exhaust valve stem. (Note: For adjustment see "Inspection page 5.") If there is still no compression the exhaust valve is not seating properly and must be reground. (Note: This will never occur in a new engine. It will only occur after the engine has been run a sufficient length of time for a carbon deposit to form on the valve seats.) To regrind exhaust valve, remove ignition cable from spark plug. Then remove the two cylinder head screws. Cylinder head can now be lifted straight up bringing tube from carburetor to cylinder head with it. Tube can then be pulled out of hole in cylinder head. Exerting pressure on washer at top of exhaust valve spring, but not on exhaust valve stem, and supporting exhaust valve from under side, depress spring enough to allow you to slip the "U" washer off the stem. Spring and exhaust valve can now be removed. Secure a small amount of valve grinding compound from any garage, supply store or motorcycle shop. Cover seat of exhaust valve thinly with this compound, replace valve in cylinder head, and oscillate rapidly by rolling the stem back and forth between thumb and forefinger. It is not necessary to exert very much pressure in doing this. When clean metal shows all around on both valve and seat and there are no "pits" or black spots showing, then the valve is ground in. Wash valve and seat thoroughly with gasoline and assemble.



Showing Cylinder With Head Removed



Showing Method of Compressing Exhaust Valve Spring

FIGURE 8

TO REPLACE CYLINDER HEAD

Until very recently all engines have been furnished with a plain asbestos gasket between cylinder head and cylinder. All traces of this gasket must be entirely removed from the cylinder head and the top of the cylinder. Never use an old asbestos gasket. Always use a new gasket. We are now using a copper asbestos gasket which may be used again if in good condition. Place the intake tube in cylinder head. Then put cylinder head in proper position, inserting intake tube in carburetor. Insert screws and screw them down with the fingers. When the screws commence to draw down on cylinder head do not draw one down perfectly tight and then the other one, but draw them down so that both sides of the cylinder head will meet the cylinder evenly, turning first one screw and then the other a half turn at a time until the head is properly seated in the cylinder.

INTAKE VALVE

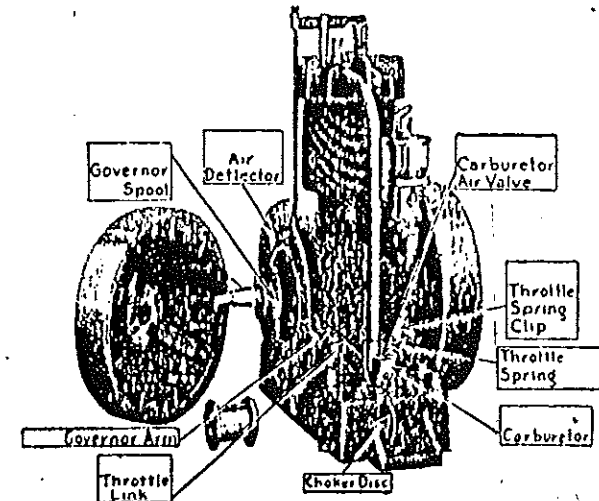
In all type F & FB and some FC engines the intake valves were spud in place on the cylinder head. If necessary to replace we can, however, furnish latest style valve as used on new FC engine which can be readily replaced. To remove intake valve proceed to remove cylinder head as described under "Lack of Compression." If top of valve is spud to washer which supports top end of valve spring, the top of valve must be filed or ground off, after which the washer and spring can be pulled off and the valve will then drop out. On the new style valve there is a cotter pin through the castellated nut or collar at the top of valve. After removing this cotter pin the nut may be unscrewed and the valve removed.

The new valve must be ground in as described for the exhaust valve under "Lack of Compression" and may then be seated and reassembled, screwing the nut on tight and inserting cotter pin to retain.

WORN PISTON RINGS OR SCORED CYLINDER

This condition can be identified by the sound of air rushing down into crankcase when point of compression is reached. It can only be caused by using a poor grade of lubricating oil, by running the engine without sufficient oil in the crankcase, or after long use. To remedy requires the service of one familiar with engine construction and we recommend that you write us and arrange to have engine returned to the factory for repairs.

If you have gasoline, ignition and compression, and your engine will not run, then there is something wrong which you should not attempt to fix, but should return engine to factory. Generally the only reason an engine will not start is because there is no gasoline, the spark plug is fouled or cracked, or the electric connections are loose or broken.



Showing the Governor and its Parts and Connections
FIGURE 4

SPEED REGULATION

The speed of the engine is set properly when leaving the factory, and there should be no need of adjustment unless the governing mechanism has been disarranged in transit. If it is necessary to change speed, proceed as follows:

Immediately in rear of carburetor will be found a double arm lever attached to a small stem entering carburetor. From one of these arms a wire extends to the governor in the flywheel. From the other arm a coil spring extends to a small bracket fastened to the crankcase by a screw. Loosen this screw and move bracket to the left to decrease speed, and to the right to increase the speed.

There is nothing to get out of order in the governor mechanism unless the governor spool (Figure 4) is tight on the crank shaft. It should slide easily. If it does not do so, it should be removed and the bore increased slightly.

TIMING THE FULLPOWER ENGINE, ALL MODELS

If the connecting rod has not been disassembled from the crank shaft, even though the engine has been otherwise disassembled, the timing gears will not be disengaged and the engine will not have to be retimed.

If the connecting rod has been disassembled from the crank shaft, the timing gears will have been disengaged, and when reassembling the engine the gears must be properly engaged, or "meshed", or the engine will not run.

After the connecting rod has been properly assembled to the piston by means of the piston pin, this pin being locked by the piston pin lock, the piston and connecting rod is inserted into the cylinder from the top, the cylinder head being removed. Insert the crank shaft thru the large opening in the crank case, from which the magneto was removed, meshing the pinion (small gear) on the crank shaft with the cam gear. This cam gear should be on its stud with the cam part of the gear toward the wall of the crank case. The cam follower should be on its stud, secured in place by a cotter pin, with the free end of the cam follower riding on the cam of the cam gear. Insert valve push rod thru small hole in top of crank case (see Fig. 9), lower end of rod resting on cam follower. Revolve crank shaft to the left or anti-clockwise, at the same time holding push rod down on cam follower until the push rod just begins to rise. It will be best to do this several times so the exact spot may be determined. You will readily feel when the cam begins to push the cam follower and push rod up. If you have the timing gears properly meshed, the crank pin of the crank shaft, or, in other words, the part of the crank shaft to which the connecting rod will be fastened, will be nearly in its topmost position. It will be to the right of its topmost position about 10° and will be pointing, nearly directly, towards the top one of the three screw holes in the crank case, in which the screws fit that fasten the magneto to the crank case.

If, when the push rod is just beginning to rise, the crank shaft is not in the correct position, pull it straight out toward you, disengaging the timing gears. Revolve it until it assumes the correct position described above, then push it straight in, engaging the timing gears. During this operation be sure that the cam gear has not moved. If you should engage the gears incorrectly, even so little as one tooth, the position of the crank shaft, when the push rod begins to rise, will be so far wrong that it will be readily apparent.

After the gears have been meshed properly, assemble the connecting rod to the crank shaft, being sure that the screws holding the connecting rod cap in place are drawn down tightly and have lockwashers under each head.

TO STOP ENGINE

Engine can be stopped by placing the choker disc on the carburetor or by holding down the intake valve. If the engine is equipped with a short circuiting switch, the switch should be closed and held closed until engine stops.

OPERATION AND CARE

Always use a good grade of gasoline and be sure there is a sufficient amount in the tank. Use the very best grade of cylinder oil of medium weight. Be sure oil is up to proper level.

Inspect spark plug frequently and keep points free from carbon and at proper distance from each other.

KEEP YOUR ENGINE CLEAN. IT CANNOT TAKE CARE OF ITSELF.

ORDERING PARTS

This parts list is issued for your convenience in ordering parts. All parts are illustrated in the various plates and also listed in the list of parts.

In order to save delay and correspondence **INSTRUCTIONS GIVEN BELOW MUST BE CAREFULLY OBSERVED IN ORDERING PARTS.**

HOW TO ORDER

Be sure to write plainly and legibly. Do not write on any other subject in the same letter. Select the parts numbers by referring to both the plates and the list of parts, comparing parts with illustrations. Bear in mind that parts for type F, FB and FC engines are shown in the plates and listed in the parts list and be sure that part number selected applies to your particular engine. **ALWAYS ORDER BY PART NUMBER AND GIVE AT THE SAME TIME DESCRIPTION OF PARTS.** Do not depend on numbers cast on parts as being correct. **ALWAYS GIVE ENGINE NUMBER AND ENGINE TYPE IN ORDERING PARTS.** This will be found stamped either on the rim of the flywheel or on the crank case.

SHIPPING INSTRUCTIONS

Always state on the order whether shipment is desired by express, freight or parcel post.

REMITTANCE

Remittance in full must accompany each order. We will not ship C. O. D. unless a deposit of more than twice the transportation charge has been made. Remit by post office or express money order. Stamps will be accepted for parts orders less than One Dollar (\$1.00) only. Remittance must include postage charge if to be shipped by mail and also include ten cents (\$0.10) to cover insurance. Any excess remittance or postage will be returned. **MINIMUM CHARGE IS 25 CENTS.**

PRICES

Prices quoted herein are subject to change without notice. In case of change orders will be filled at current prices. All parts are sold F. O. B. factory.

INSTRUCTIONS ON RETURNING MATERIAL

Never return any material to us without writing us a letter explaining what parts are being forwarded, the engine number and the reason for return. Tag each piece with your name and address and number of engine. Transportation charges must be prepaid on all return shipments as otherwise they will not be accepted.

PARTS PRICE LIST FOR "FULLPOWER" ENGINE MAGNETO TYPE

This list includes all parts for type F, FB and FC engines. All parts listed are used on all three types unless otherwise specified. In view of the fact that some changes were made before new type letters were assigned, it is necessary to check illustrations and this list carefully to select proper part. Parts of type F engine are shown on figure 5 and parts of type FC engines are shown on figure 6. Parts of the FB engine are shown in part in Figure 5 and in part in Figure 6.

Part No.	Description	Price
EA-B	Cylinder Assembly consisting of EA-1 Cylinder, EA94 Bushing, EA63 Cam Gear Stud, EA62 Cam Follower Stud, EA118 Taper Pin, 13M14 Drain Tube	\$20.00
*EA-AB	Cylinder Head Assembly consisting of EA-C Cylinder Head, EA45 Exhaust Valve Spring, EA57 Valve Spring Gasket, EA65 Exhaust Valve, 65562 Valve Spring Washers, EA38 Valve Spring Cup, EA34 Valve Spring Washer	10.00
*65299	Cylinder Head Assembly consisting of EA-AB Cylinder Head, 65229 Rocker Arm, 90680 Set Screw	12.50
*EA-C	Cylinder Head Assembly consisting of EA2 Cylinder Head, EA15 Intake Valve, EA46 Intake Valve Spring, EA86 Intake Valve Collar, EA57 Valve Spring Gasket, 65562 Valve Spring Washers. Intake Valve parts listed on EA-C Cylinder Head Assembly above, are spun in place and cannot be finished separately. These parts are used on Model F., F. B. and early F. C. engines. Late F. C. engines are equipped with 65663 Intake Valve, 65653 Intake Valve Collar, 7K47 Intake Valve Cotter Pin, EA46 Intake Valve Spring, EA57 Intake Valve Gasket, 65562 Intake Valve Washers, which can be serviced separately and should always be ordered when necessary to replace Intake Valve on any type engine	9.00
*65379	Cylinder Head Assembly consisting of EA-C Cylinder Head, 65229 Rocker Arm, 90680 Set Screw	11.50
*Note: If engine number is prefixed by "F.B." or "F.C." assemblies EA-AB or EA-C may be ordered. If engine number is prefixed by "F." then either 65299 or 65379 must be ordered, as it is necessary to substitute new rocker arm when changing cylinder head on model "F." engine.		

Part No.	Description	Price
EA-D	Governor Flywheel Assembly consisting of EA4 Governor Flywheel, EA25 Governor Weights (2) EA27 Governor Washer, EA111 Escutcheon Pins (4)	6.00
EA-G	Crank Shaft Assembly consisting of EA14 Crank Shaft, EA60 Crank Shaft Gear, (for use on Model F. B. and F. C. engines equipped with oil Pumps)	14.00
65629	Crank Shaft Assembly consisting of 65136 Crank Shaft, EA60 Crank Shaft Gear, (Model F. with Oil Cup, and Model F. B. and F. C. not equipped with Oil Pumps)	12.00
65739	Connecting Rod Assembly consisting of Connecting Rod with Babbitt Bushings, 13A27 Screws (2), 13A2 Lockwashers (2), (Model F.) (Order this number for all engines with external Oil Cup)	5.00
EA-H	Connecting Rod Assembly consisting of Connecting Rod with Babbitt Bushings, 13A27 Screws (2), 13A2 Lockwashers (2), (Models F. B. and F. C. engines equipped with Oil Pumps)	5.00
65429	Connecting Rod Assembly consisting of Connecting Rod with Babbitt Bushings, 13A27 Screws (2), 13A2 Lockwashers (2), 65483 Oil Dipper (model F. C. engine not equipped with Oil Pumps, but equipped with oil trough on diaphragm)	5.00
EA-J	Piston Assembly consisting of EA6 Piston, EA98 Piston Ring (Model F. and F. B.)	3.00
65709	Piston Assembly consisting of 65471 Piston, 65451 Piston Ring (2) (Model F. C.)	4.50
EA-K	Carburetor Assembly, Small size with $\frac{3}{8}$ " opening at top. (Early Model F.)	3.50
65369	Carburetor Complete consisting of 65359 Carburetor, EA-L Carburetor Cap, EA-V Carburetor Choker. (Opening into which Carburetor Cap screws in is $\frac{3}{8}$ " in diameter. (Late Model F. and F. B.)	7.00
65359	Carburetor consisting of EA18 Carburetor Body, 65329 Gas Pipe Assembly, EA28 Throttle Valve, EA76 Throttle Shaft, EA29 Throttle Arm, EA104Rd. Hd. Mach. Screws. Used on 65369 Carburetor (Late Model F. and F. B.)	6.00
65459	Carburetor Complete consisting of 65329 Gas Pipe, 65441 Carburetor Body, 65463 Headless Set Screw, 90608 Fil. Hd. Mach. Screw No. 8-32x $\frac{1}{4}$ ", EA76 Throttle Shaft, 65402 Throttle Plate, EA28 Throttle Valve, 65393 Hex. Brass Nut 5/16"-27 th'd x $\frac{1}{2}$ ". (Model F. C.)	6.00
EA-L	Carburetor Cap for EAK Small Size Carburetor having $\frac{3}{8}$ " opening at top. (Early Model F.)	.56
65609	Carburetor Cap for 65369 Carburetor with $\frac{3}{4}$ " opening at the top (supersedes EAL New Style) consisting of 65473 Carburetor Cap 65463 Carburetor Cap Set Screw. (Late Model F. and F. B.)	.50
65329	Gas Pipe Assembly for 65369 and 65459 Carburetors. Consisting of 65423 Gas Pipe, 65363 Check Valve, 65342 Ball Retainer, 65332 Screen, EA110 Bronze Ball, 65383 Nozzle, (Late Model F., F. B. and F. C.)	1.00

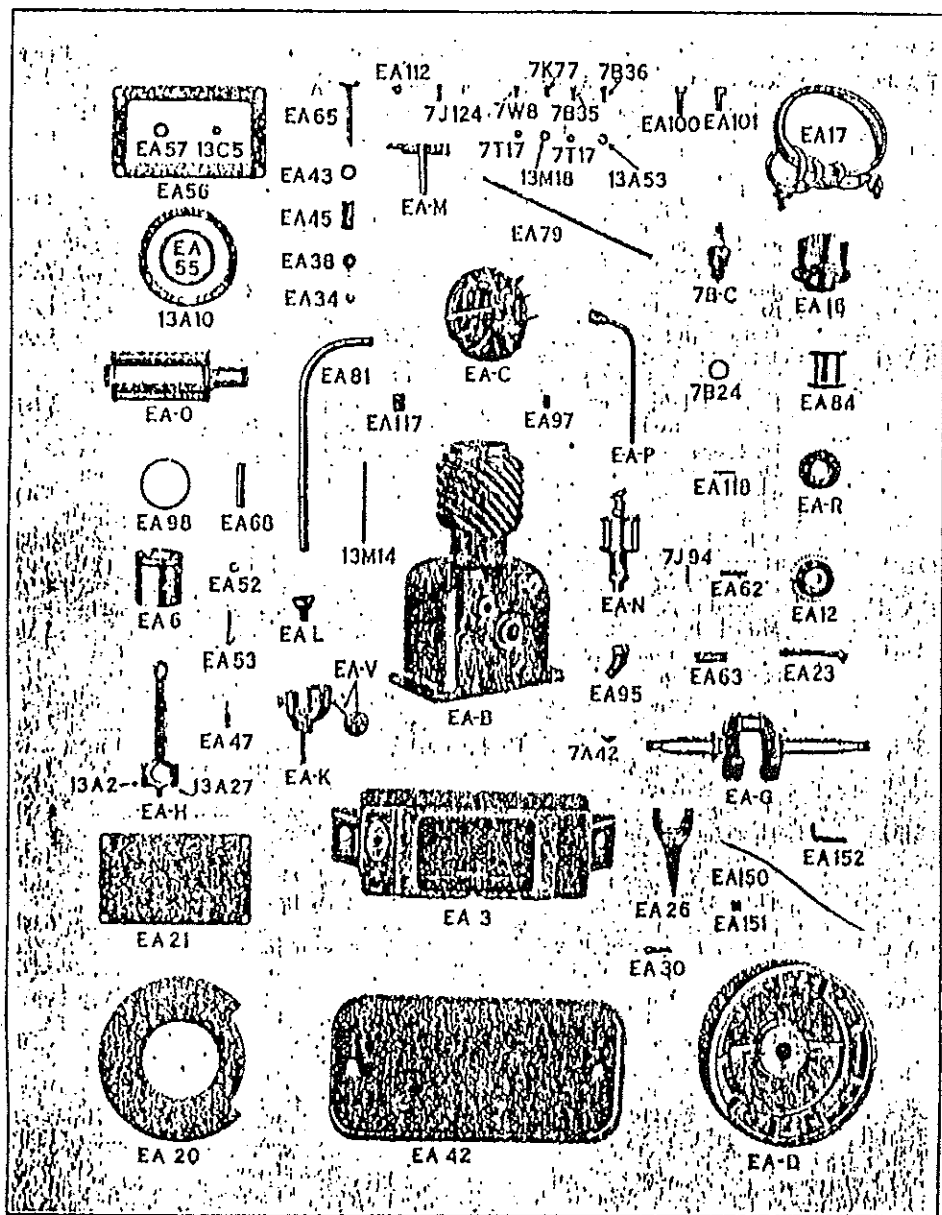


Figure 5—Type F. Engine Parts
18

Part No.	Description	Price
EA-V	Carburetor Choker Assembly consisting of EA39 Carburetor Choker, E. A. 115 Carburetor Chain. For 65369 Carburetor (Model F. and F. B.) .....	.20
65382	Choker Disc. (Model F. C.) .....	.10
EA-M	Rocker Arm Assembly consisting of EA61 Rocker Arm Fork, EA80 Rocker Arm Pin. (This Rocker Arm is threaded and screws into Cylinder Head.) (Model F.)	1.50
65229	Rocker Arm Assembly consisting of 65241 Rocker Arm, 65281 Rocker Arm Fork, 65303 Rocker Arm Pin. (This latest type of Rocker Arm may be identified by the cast bronze arm.) (Model F. B. and F. C.)	2.50
EA-N	Oil Cup Assembly (Model F.)	2.60
EA21	Diaphragm (Model F.) .....	.20
*65259	Oil Pump and Diaphragm Assembly consisting of 65231 Oil Pump Body, 65086 Oil Pump Ball (2), 65076 Oil Pump Spring, 65113 Oil Pump Plunger, 90695 Cotter Pin, 65096 Screen (2), 65353 Ball Retainer, EA21 Diaphragm (Model F. B. and F. C.)	2.15
*65599	Oil Trough and Diaphragm Assembly consisting of 65529 Oil Trough, 65572 Diaphragm. (Model F. C.) .....	.80
EA-O	Muffler Assembly consisting of EA75 Muffler Tube, 65352 Muffler Shell, 13A42 Muffler End, EA119 Muffler End, EA106 Finishing Nail	2.50
EA-P	Breather Tube Assembly consisting of 13A82 Breather Tube, EA96 Breather Pipe Plug (Model F.)	1.00
65419	Breather Tube Assembly consisting of 65461 Breather Body, 13A16 Breather Cover, 65613 Breather Tube (Model F. B. and F. C.)	1.90
EA-R	Governor Spool Assembly consisting of EA64 Governor Spool, EA71 Governor Spool Pin (2) .....	.70
13MJ	Magneto Assembly complete (Model F. and F. B.)	22.50
65659	Magneto Assembly complete with air Guide (Model F. C.)	22.50
65399	Crank Case Cover (Model F. and F. B.)	5.00
65689	Crank Case Cover with Air Guide (Model F. C.)	6.00
13MII	Armature Assembly	9.80
13MC	Fly Wheel Assembly (Model F. and F. B.)	11.00
65479	Fly Wheel Assembly (Model F. C.)	13.00
13MD	Breaker Arm Assembly with Point and Fibre Bushing	1.50
13ME	Contact Bracket and Point .....	.52
13MG	Condenser Assembly	2.50
7BC	Spark Plug with 7B24 Gasket	1.25
EA2	Cylinder Head	6.50
EA3	Base 1/2 Gal.	4.50
EA6	Piston Only (Model F. and F. B.)	2.75
65471	Piston Only (two piston rings) (Model F. C.)	2.75

*Note: Some Model F. C. engines are equipped with Oil Pumps mounted on the diaphragm. This Assembly is No. 65259. Some of the Model F. C. engines do not employ a pump but have a Trough on the diaphragm into which the Connecting Rod dips, splashing the Oil. This Assembly is No. 65599.

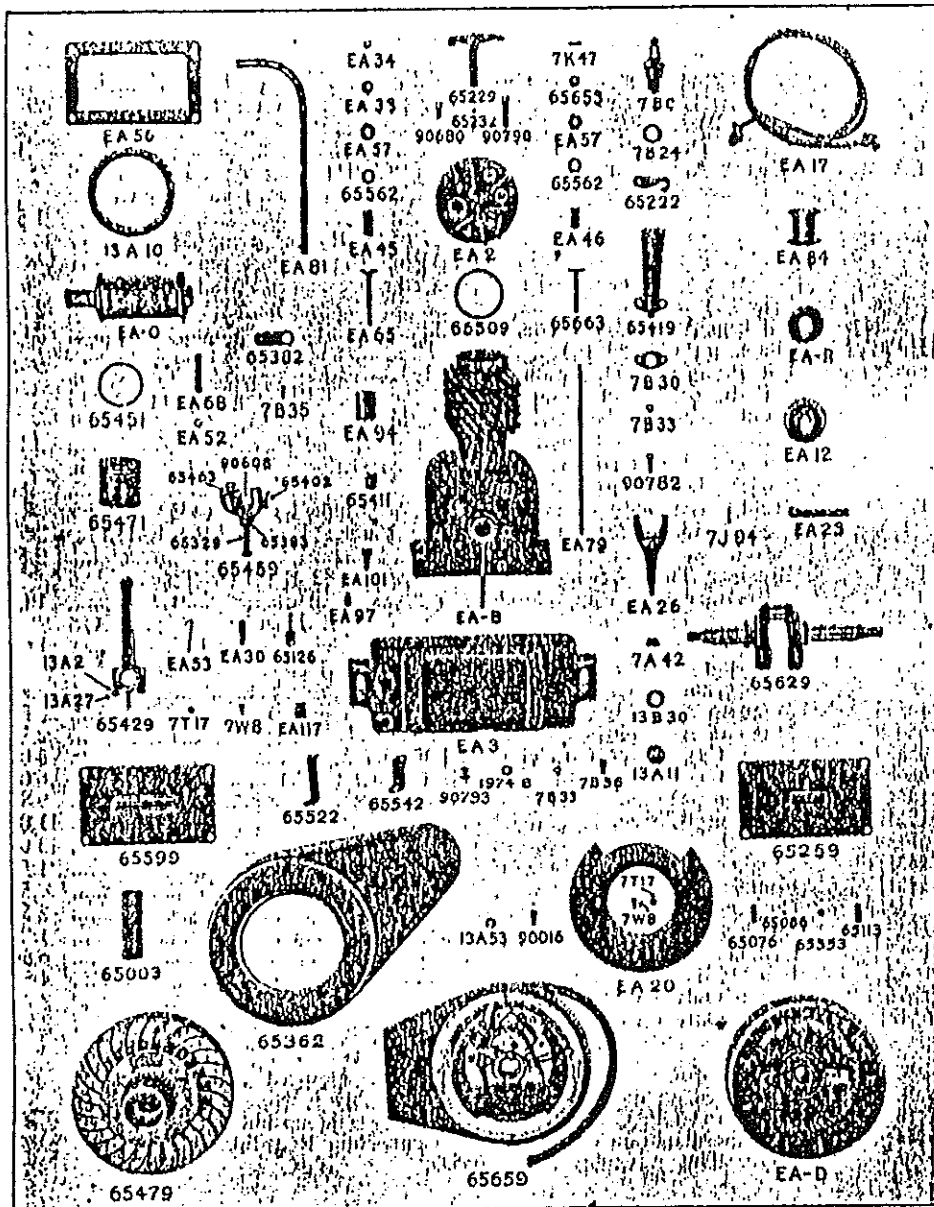


Figure 6—Type F. C. Engine Parts

Part No.	Description	Price
EA12	Cam Gear	2.00
EA16	Starting Pulley (Model F. and F. B.)	2.25
EA17	Starter Rope .....	.05
EA20	Air Deflector .....	.20
EA23	Cam Follower Stud .....	.16
EA26	Governor Arm .....	.12
EA30	Throttle Spring Clip .....	.10
EA34	Valve Spring Washer .....	.04
EA38	Valve Spring Cup .....	.10
EA43	Valve Spring Support (Obsolete. Replaced by 65562).....	.10
EA45	Exhaust Valve Spring .....	.15
EA46	Intake Valve Spring .....	.15
EA47	Throttle Spring (Obsolete. Replaced with 65126).....	.15
65126	Throttle Spring .....	.05
EA52	Piston Pin Lock .....	.10
EA53	Throttle Link .....	.10
EA55	Cylinder Head Gasket (Asbestos) (Model F.) .....	.06
65509	Cylinder Head Gasket (Copper Asbestos) (Model F. B. and F. C.)....	.08
EA56	Diaphragm Gasket .....	.04
EA57	Valve Spring Gasket .....	.05
EA65	Exhaust Valve	1.00
EA68	Piston Pin .....	.60
EA79	Push Rod .....	.10
EA81	Intake Pipe .....	.75
EA84	Drive Pulley (furnished when specified)	2.75
EA94	Bushing for Cylinder	1.00
EA95	Oil Cup Elbow (Model F.) .....	.20
65411	Oil Filler Pipe Plug 1/8" (Model F. B. and F. C.) .....	.10
EA97	Drain Pipe Plug 1/8" .....	.06
EA98	Piston Ring (Model F. and F. B.) .....	.55
65451	Piston Ring (Model F. C.) .....	.55
EA100	Cylinder Head Screw 5/16"—18 U. S. S. Th'd x 1" lg. Hex. Head (Model F. and F. B.) .....	.05
90790	Cylinder Head Screw 5/16"—18 U. S. S. Th'd x 1 1/4" lg. Fill. Head (Model F. B. and F. C.) .....	.05
EA101	Cylinder Screw 5/16"—18 U. S. F. Th'd x 3/4" lg. Hex. Head.....	.05
EA104	Carburetor Nozzle Screw for 65359 Carburetor (Model F. B.).....	.02
EA112	Rocker Arm Screw Nut for EAM Rocker Arm (Model F.).....	.02
EA117	Gasoline Filler Pipe Plug 3/8" .....	.10
7A42	Woodruff Key for Crank Shaft .....	.10
13A2	Connecting Rod Lock Washers .....	.01
13A10	Crank Case Cover Gasket .....	.12
13A11	Fly Wheel Nut 9/16"—18 Th'd .....	.21
13A27	Connecting Rod Screw .....	.05
13A53	Lockwasher 1/2" For Crank Case Cover .....	.01
7B24	Spark Plug Gasket .....	.03
7B30	Breather Tube Gasket (For use with 65419 Breather Tube) (Model F. B. and F. C.) .....	.10
7B33	Lockwasher for 90782 Breather Tube Mounting Screw and for Blower Case Clamp .....	.01

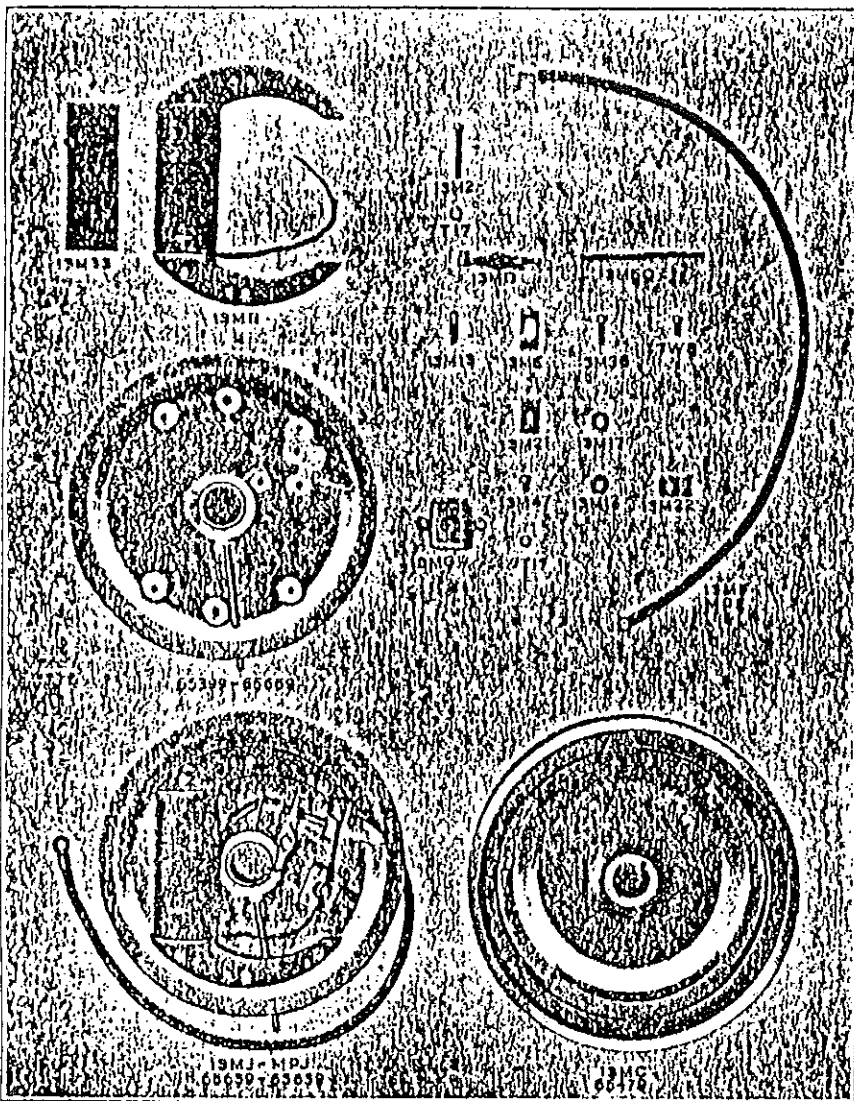


Figure 7--Magneto Parts

Part No.	Description	Price
7B35	Fill. Head Cap Screw No. 10-32 U. S. F. Th'd x 1/2" lg. (For Carburetor and EAM Rocker Arm)	.01
7B36	Fill. Head Mach. Screw No. 14-20x1/2" lg. For Crank Case Cover and for Blower Case Clamp	.05
13B30	Lockwasher 9/16" For Flywheel Nut	.03
1974B	Washer for 7 B 36 Screw	.01
7J94	Cam Follower Cotter Pin	.01
7K47	Intake Valve Cotter Pin	.01
13MF	Ignition Cable	.50
13M2	Armature Core Screw	.05
13M12	Bracket Bushing	.06
13M13	Breaker Arm Spring	.05
13M14	Drain Tube	.20
13M17	Bracket Washer	.05
13M21	Bracket Shim	.05
13M22	Ignition Cable Clamp	.07
13M33	Coil Insulator	.10
13M36	Fill. Head Screw No. 10-32 U. S. F. Th'd x 3/8" lg. for 13 ME.	.02
13M47	Condenser Screw	.03
13M50	Armature Lead Insulator 3" long	.05
65167	Condenser Lead Insulator 1 1/4" lg.	.05
7T17	Lockwasher 3/16" For Air Deflector and Throttle Spring Clip	.01
7W8	Fill. Head Cap Screw No. 10-32 U. S. F. Th'd x 3/8" lg. For Air Deflector and Throttle Spring Clip	.03
65003	Socket Wrench	.30
65076	Oil Pump Spring (Model F. B. and F. C.)	.10
65086	Oil Pump Ball (Model F. B. and F. C.)	.05
65107	Ignition Cable Sleeve	.10
65113	Oil Pump Plunger (Model F. B. and F. C.)	.10
65222	Ignition Cable Clamp	.15
65232	Slug for 90680 Set Screw	.02
65241	Rocker Arm Only (Model F. B. and F. C.)	1.00
65281	Rocker Arm Fork (Model F. B. and F. C.)	1.50
65303	Rocker Arm Pin (Model F. B. and F. C.)	.10
65353	Oil Pump Ball Retainer (Model F. B. and F. C.)	.20
65362	Blower Case (Model F. C. not furnished with all engines)	1.00
65393	Hex. Brass Nut 5/16"-27 th'd x 1/2" for 65369 and 65459 Carburetor (Model F. B. and F. C.)	.10
65463	Headless Set Screw for 65459 Carburetor and 65609 Carburetor Cap (Model F. B. and F. C.)	.10
65473	Carburetor Cap Only for 65609 (Late Model F. and F. B.)	.40
65522	Blower Case Clamp (large) (Model F. C.)	.15
65542	Blower Case Clamp (small) (Model F. C.)	.15
65562	Intake Valve Washer	.05
65653	Intake Valve Collar	.20
65663	Intake Valve	1.50
90016	Rd. Hd. Mach. Screw No. 14-20x1/2" lg. For Crank Case Cover	.05
90608	Fill. Hd. Mach. Screw No. 8-32x1/4" lg. For 65459 Carburetor (Model F. C.)	.05
90680	Set Screw for Cylinder Head	.05

Part No.	Description	Price
90695	Oil Pump Cotter Pin 1/16"x15/16" lg. (Model F. B. and F. C.).....	.02
90782	Fill. Head Mach. Screw No. 14-20x3/4" lg. for Breather Tube No. 65419 (Model F. B. and F. C.).....	.05
90793	Stove Bolt with Nut for 65542 Blower Case Clamp .....	.03
FAN ASSEMBLY—FURNISHED WHEN REQUIRED ONLY FOR MODELS F. AND F. B. ONLY		
13BJ	Fan Assembly consisting of 13BC Fan, 13BO Fan Shaft, 13B35 Spring, 13B38 Plain Washer, 13B39 Grease Cup, 7F20 Hex. Nut....	3.25
13BC	Fan Sub Assembly consisting of 13 B 12 Fan, 13 B 28 Pulley, and 13 B 29 Bushing.	2.50
13BO	Fan Shaft Assembly consisting of 13B11 Shaft and 13B36 Collar.....	.75
EA19	Fan Drive Pulley	3.00
EA88	Fan Bracket	1.75
7B25	Fill. Hd. Cap Screw 1/4"-20 U. S. F. Th'd x3/4" lg. for E. A. 88 Bracket .....	.04
7B33	Lockwashers 1/4" for 7B25 Screw .....	.01
13B29	Bushing .....	.35
13B35	Spring .....	.05
13B38	Plain Washer .....	.05
13B39	Grease Cup .....	.10
7F20	Hex. Nut 5/16"-24 S. A. E. Th'd .....	.05
65137	Fan Belt .....	.60

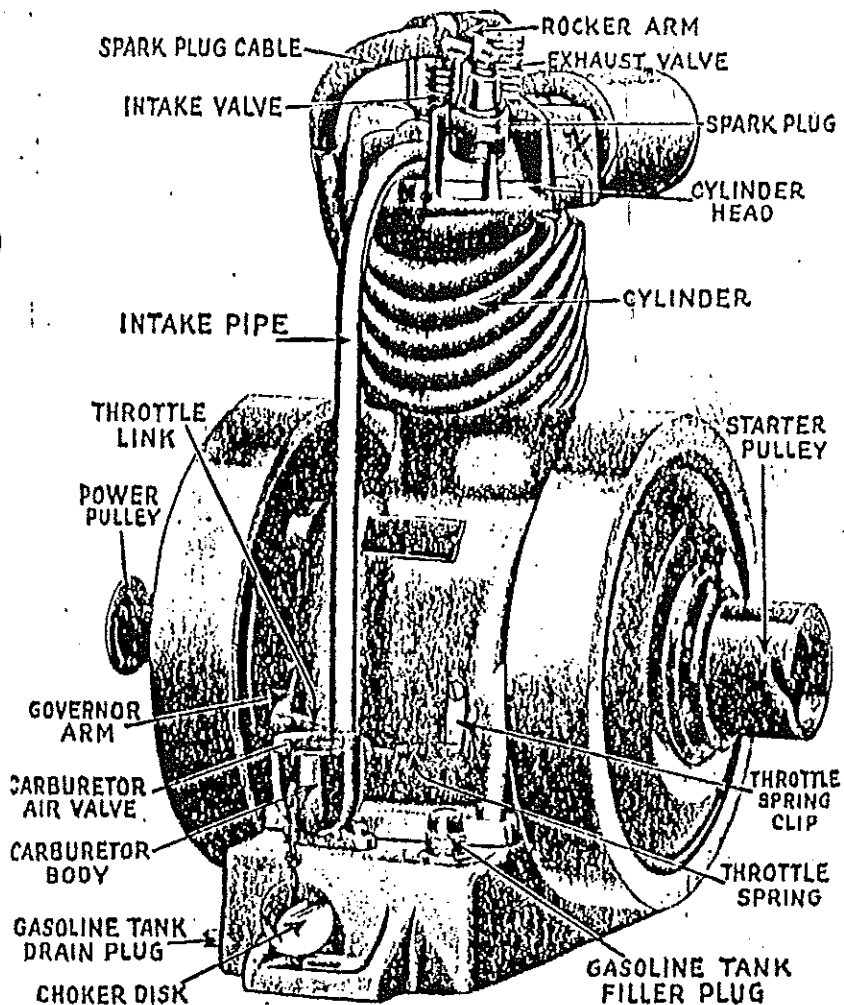
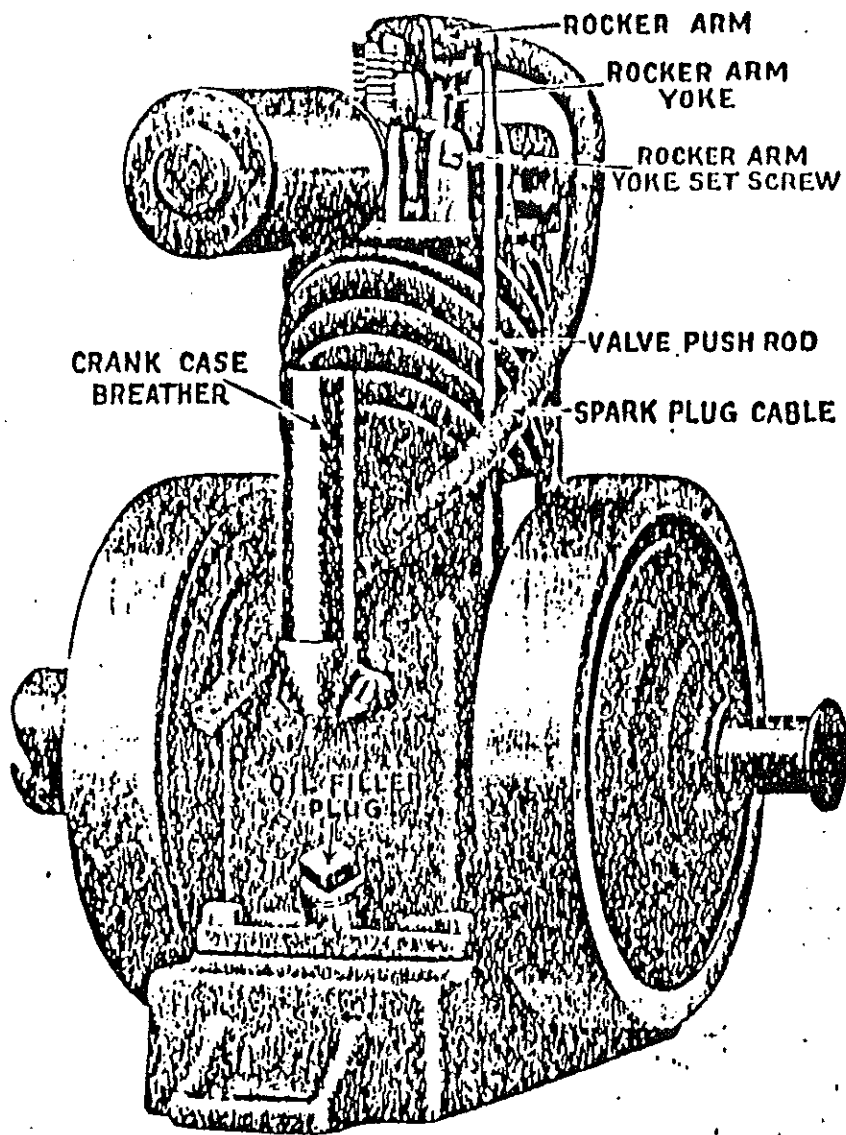


Figure 8—Front View of Type F. B. Engine



Rear View of Engine.
 Figure 9—Rear View of Type F. B. Engine
 26

INDEX TO CONTENTS

	Page
Compression, Lack of	10
Cylinder, Scored	12
Cylinder Head, illustrated	11
Cylinder Head, To replace	12
Engine—Type F., illustrated	4
Engine—Type F. B., Front View, illustrated	25
Engine—Type F. B., Rear View, illustrated	26
Engine—Type F. C., illustrated	Cover
Filling	7
Gasoline	9
Governor, illustrated	13
Ignition	9
Inspection	6
Instructions for use	5
Intake Valve	12
Lubricating	7
Ordering Parts	15
Oil Cup—Type F., illustrated	7
Operation and Care	15
Parts List—Type F., F. B. and F. C.	16-24
Parts of Magneto, illustrated	22
Parts of Type F. Engine, illustrated	18
Parts of Type F. C. Engine, illustrated	20
Piston Rings, worn	12
Prices	16
Remittances	15
Return Material	16
Speed Regulation	13
Starting Engine	8
Stopping Engine	14
Timing	13