



Bull Dog Operator's Manual

All Bull Dog Engines

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BD-O-ALL

Operator's Manual

General Instructions for Installing, Operating and Maintaining Bull Dog Engines

It should always be remembered at times when a difficulty seems to call for the services of an expert that it is probably of a nature which may easily and quickly be adjusted by anyone who will seek the cause of the trouble in an intelligent manner.

The construction of a Bull Dog engine is simple; the functions of the comparatively few working parts which comprise its mechanism may be readily understood, and a short time given to the study of the subject will establish all the knowledge necessary for its proper care.

No mechanical reason exists why an engine built on correct lines of good workmanship and materials, which is efficient at first, should not continue to run well for an indefinite time. It is, therefore, important at the beginning of an experience to realize that those who are methodical in the intelligent care of an engine seldom have any reason for complaint. It would seem to be a waste of time and effort to pursue any plan in trying to start an engine which has stopped for no apparent reason, other than one of investigation. When the course of failure is thus determined, it is usually remedied without difficulty or much delay.

Oiling

To operate correctly, it is necessary, with any piece of machinery, to keep it properly oiled and cleaned. The cylinder and piston of a gas engine require a special kind of mineral oil made for the purpose, free from animal or vegetable products, and of a high fire test; as the heat generated in the combustion chamber comes in direct contact with these parts. Steam engine cylinder oil must not be used, as it will cause the piston rings to stick and choke up the passages.

Use any good lubricating oil on the other parts of the engine except the stems of the valves. These need no attention except a few drops of kerosene (coal oil) occasionally.

Packing

In case the packing between the cylinder and combustion chamber or in the joint between the igniter gland and combustion chamber should blow out it should be replaced with asbestos sheet packing, not thicker than 1-32 inch. Do not use thick packing, or any packing containing rubber, as rubber packing will not stand the heat generated by a gas engine. In replacing packing observe the following rules and you will always have good results:

First. See that the face of both castings is scraped perfectly clean.

Second. Place a square piece of the asbestos packing across the cylinder studs and tap with a small hammer, which will cut the holes for the studs to pass through. Then cut the packing in the same manner on the inner and outer edges of the cylinder casting, and you will have a gasket already in place.

Piston Rings

When replacing rings great care should be taken in refitting them in order to obtain the best results. New rings are always sent somewhat over size, so they should be carefully fitted into the cylinder before putting them on the piston. Fit each ring into the cylinder, being sure that the joint is close and tight. File the joint with a sharp new file until the ring will properly compress into the cylinder and the joints come together.

Then carefully spring the rings over the piston into the grooves. It is a good idea to put the rings in boiling water before springing them over the piston as by so doing there is less liability of breakage.

Carburetor

The carburetor on the Bull Dog engine is of the suction feed type. That is, no gasoline pump is required, the vacuum caused by the piston on its outward stroke being sufficient to draw the gasoline from the base of the engine to properly supply the carburetor. The carburetor proper is connected to the base of the engine, in which the gasoline supply is contained, by a piece of small copper tubing, in which tubing a check valve is placed so that after the engine has once been started the tube always remains full of gasoline. All gasoline contains a certain amount of impurity, so that this tubing and the check valve should be occasionally cleaned out, to prevent stoppage. Many times when the engine will not run properly it is caused by a little dirt or sediment becoming lodged in the valve, so the gasoline cannot be readily drawn into the carburetor.

The amount of gasoline supplied to the engine is regulated by the needle valve, which is very finely adjusted. By opening it a very small amount of gasoline is allowed to drop into the mixing chamber, where it is mixed with air and drawn into the combustion chamber. On the bottom of the carburetor proper will be found a throttle, which can be turned so as to shut off the supply of air and aid in starting the engine. After the engine takes an explosion or two the throttle should be turned back to its open position, giving the engine the required quantity of air. This throttle is made in the shape of a pan, so the engine can be readily primed when first starting by dropping a few drops of gasoline into the pan.

Governor

The governor is very simple in construction and of the fly-wheel centrifugal type. Its function is to cut one or more fuel charges when the engine is operating under less than full load. When the engine reaches its full speed the governor weight moves toward rim of the wheel, causing the governor catch to engage the governor latch, thus preventing the side rod from operating and automatically cutting off the fuel supply until such a time as another power stroke is required. The lower end of the governor catch should stand about 1-16 inch above the upper end of the governor latch when the lower rock arm is brought up to the highest point at which it will travel by the roller pin in the large gear.

Installing Engine

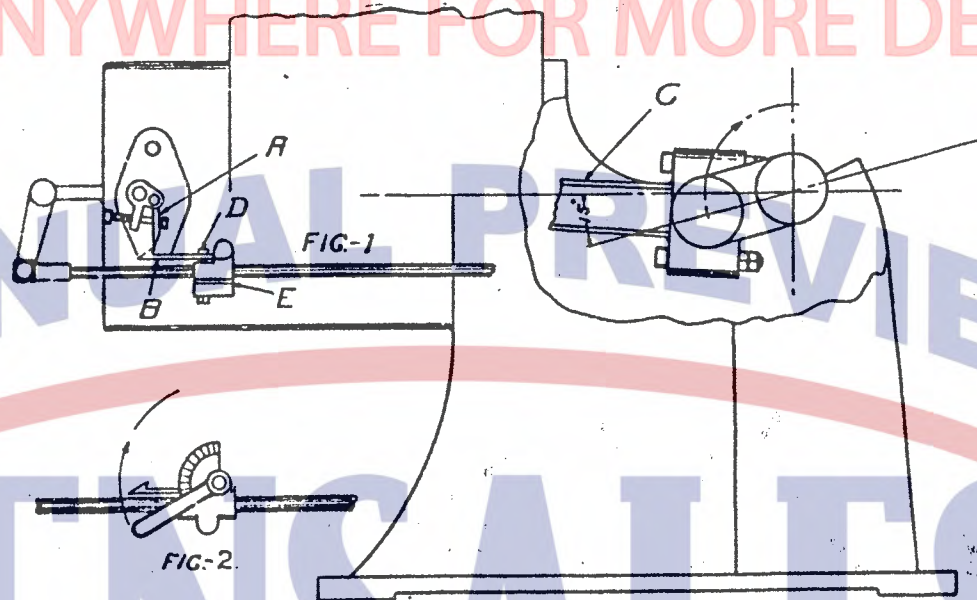
A great many engines are used on skids or for semi-portable work where a permanent installation is not required. In case, however, the engine is used for strictly stationary work, we recommend that it be put on a concrete foundation. A first-class foundation of this character can be constructed from concrete in which 4x4 or 4x6 pieces are embedded, to receive the engine. By doing this, the engine can be lag-screwed to these pieces, rendering it unnecessary to use anchor bolts in the concrete.

When the exhaust pipe is carried out of doors or away from the engine, use as few bends or elbows as possible. Never reduce the size of the exhaust pipe smaller than the opening on the engine.

A drip valve should be placed in the exhaust pipe at the lowest point to drain off the condensation in the pipe which might otherwise flow back into the engine and cause trouble.

The muffler may be placed on the end of the exhaust pipe or close to the engine, as may be preferred.

Timing Igniter



To develop its full power every gas engine must fire the charge at the proper time. The construction of our igniter is very simple. When the igniter lip "A" is brought down by the igniter hook "B" the electrodes or igniter points are brought together completing the electric circuit. When the hook slips off from the igniter lip the points are suddenly separated, which produces the spark and fires the charge. Every engine is correctly timed and adjusted before shipment, but in case it becomes necessary to time the igniter, carefully observe the following:

The 2, 3, 4 and 5 HP engines have fixed spark as shown in Figure 1. That is, the time of ignition is not altered when starting.

The 6, 8, 12 and 16 HP engines have a small lever on the side rod clamp by which the time of ignition is made late or early for starting and running, as shown in Figure 2. When the lever points down the ignition is late and as the lever is moved upward, it is made earlier. When timing the igniter on these sizes, place the lever in a horizontal position, but when starting the engine place the lever pointing downward as shown in Figure 2, which will fire the charge later and prevent "kicking." After the engine is running raise the lever upward slowly until the proper firing point is reached.

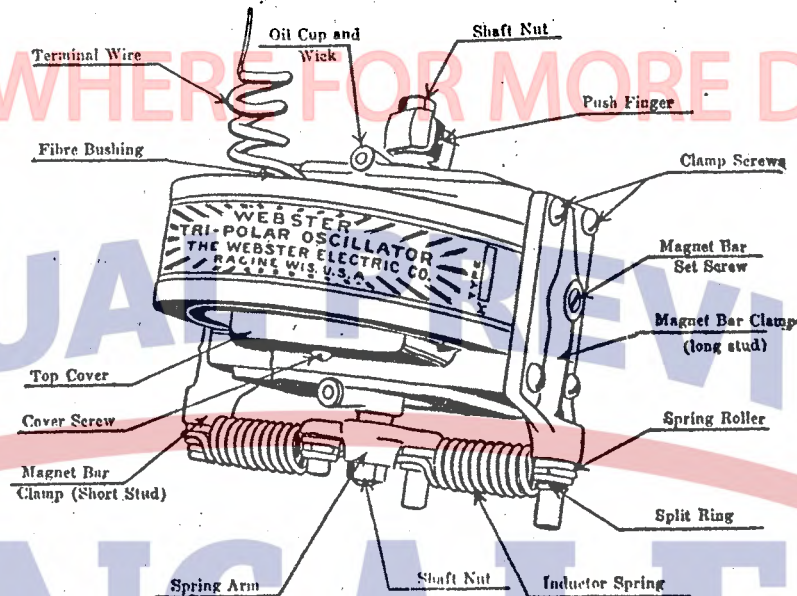
Turn the engine over slowly by hand in its natural direction (clock wise), facing governor side, stopping the instant the igniter hook "B" slips off from the igniter lip "A," then note the position the crank shaft is in. When the hook slips off from the igniter lip thus firing the charge, the connecting rod "C" should be in the position as indicated which is about 15 degrees before it reaches the dead center. The point at which the igniter hook slips off the igniter lip can be regulated by means of the adjustment screw "D" which passes through the igniter hook, but if the variation is too great the igniter clamp "E" can be moved forward or backward slightly on the side rod as the case may require.

For instructions covering timing of igniter on engines provided with Webster magneto see page 8.

To Start Engine

First. See that all moving parts are properly oiled and the cylinder oiler filled with good gas engine cylinder oil. On a new engine it is advisable to inject a quantity of oil directly into the cylinder through the relief cock, working the piston back and forth slowly until the oil is thoroughly worked into the rings. Give a new engine plenty of oil at first. The cylinder oiler should be adjusted to about five to eight drops per minute.

Instructions and Price List of Parts for Webster Tri-polar Oscillator as Used on "Bull Dog" Engines



Never Take Oscillator Apart Spare Part List of Oscillator Types M50-K138-L138-JZ9

Description	Price	Postage	Type M50 2 HP	Type K148 3-4-5HP	Type L138 6-8-12 HP	Type JZ9 16 HP
Base Stud Lock Washer.....	\$0 10	\$0 01	699K1	699K1	699K1	699J2
Base Stud Nut (each).....	10	01	355K	355K	355K	355J
Clamp Screw.....	10	01	567K	567K	568L	704J
Fibre Bushings.....	10	01	328J	328J	328J	328J
Inductor Spring.....	25	02	331K	331K	331K	
Inductor Spring.....	35	02				331J
Key (Woodruff).....	05	01	542J	542J	542J	542J
Magnet Bar Clamp (long or short stud).....	75	07				307JZ
Magnet Bar Clamp (long or short stud).....	65	07	307M	307K		
Magnet Bar Clamp (long or short stud).....	75	07			307L	
Magnet Bar Set Screw.....	05	01	596K	596K	596K	686J
Oil Cup.....	10	01	495K	495K	495K	
Oil Cup.....	20	01				495AJ
Oil Wick.....	05	01	497J	497J	497J	497J
Push Finger.....	1 05	03	302M40	302M40	302M40	302J9
Shaft Nut.....	10	01	357J1	357J1	357J1	355J
Shaft Nut Lock Washer.....	05	01	699J2	699J2	699J2	699J2
Spring Arm.....	1 00	03				502J
Spring Arm.....	90	03	502K	502K	502K	
Split Ring.....	10	01	582K	582K	582K	582J
Spring Roller.....	15	01	314K	314K	314K	314J
Starting Lever.....	25	03	577K	577K	577K	
Starting Lever.....	50	04				577J
Terminal Screw.....	05	01	701K	701K	701K	701K
Terminal Wire.....	10	01	552J	552J	552J	552J
Top Cover.....	45	03	A340M			
Top Cover.....	50	04		A340K	A340K	
Top Cover.....	75	04				A340BJZ
Top Cover Screw.....	05	01	341K	341K	341K	341J
End Plate.....	1 35	07				A371BJ
End Plate.....	1 10	07	A371K	A371K	A371K	

NOTE—When ordering "BJ" End Plates specify whether square, scalloped or rectangular.

When ordering "K" End Plates specify whether brass or die cast.

Defective parts, if any, must be returned for replacement or credit.

Add three cents to remittance to cover parcel post insurance on shipment.

Be sure, when ordering parts, to give horse power, oscillator type and number.

Do Not Fail to Read Carefully Instructions
Marked with a 

Instructions for Using Webster Tri-Polar Oscillator Types M-50, K-138, L-138, JZ-9

To Start Engine

1 Move timing lever (J, Fig. 2) to the left. This is the retarded or starting position.

2 Turn flywheels forward until oscillator trips, and stops in this position. The crank should now be set on dead center.

3 Cock oscillator with starting lever "A," as in Fig. 1.

4 Open needle valve. Close damper or hold hand over intake pipe and turn fly wheels forward about a quarter of a revolution to draw charge of gas into cylinder.

5 Pull fly wheels back against compression and trip oscillator quickly by pressing down on starting lever "A." This will start the engine. After a few explosions, move timing lever "J" to the left. This is the advanced or running position.

6 Adjust needle valve of mixer until best results are obtained. Small engines may be started by cranking, care being taken to have timing lever "J" in retarded position.

7 In case bracket is equipped with a priming cup, starting can be made as follows: Carry out directions 1, 2 and 3. Open needle valve as in 4. Fill priming cup with gasoline. Open priming cup valve and turn fly wheel forward about one-fourth of a revolution so that fuel is drawn in by suction. Close priming cup valve. By carrying out direction 5 the engine will start.

To Test for Spark

Important. Remove oscillator and bracket from engine and trip oscillator with starting lever "A." If a weak spark or no spark occurs at the points there are but three reasons for it.

No. 1. The adjusting screw "E" in the electrode arm "F" may not be correct. The correct position of screw "E" is when it just touches the tail of push finger "G" when the spring arm "C" is in horizontal position as in Fig. 3. Always be sure to tighten the lock nut. With the screw "E" in this position the points will always be together and a maximum spark will always be obtained. As the points wear down the screw "E" must be adjusted.

No. 2. The connections between oscillator and stationary or insulated electrode on igniter plug may be short-circuited. By this is meant the brass terminal on the electrode and the wire running from oscillator to it. Care must be taken not to bend this brass terminal or connecting wire from oscillator to terminal in such a way that either will touch any part of bracket or oscillator, as this will cause a short-circuit and no spark will occur at the points. The wire may also be broken. This can be easily replaced by removing the cover which is under magnets. Use good wire.

No. 3. The insulation on the stationary electrode is dirty or broken down, in which case the insulation must be renewed or cleaned.



FIG. 1

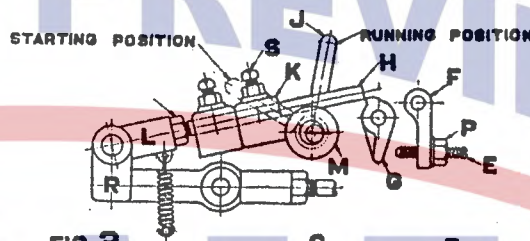


FIG. 2

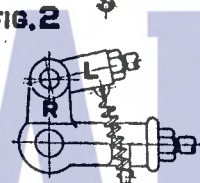


FIG. 3

Use good oil regularly
Adjustment of spark points is
very important