FOREWORD

It is more than fifty years since Wolseley engines were first produced. Their purpose was to satisfy the requirements of the Farm Industry in driving many classes of Agricultural machinery. Throughout the years, the scope has widened and so, to such items as elevators, pumps, milking machines, barn machinery and sheep shearing machinery, can be added concrete mixers and many other forms of industrial machines for which Wolseley engines are a most suitable source of power.

Exceptionally easy starting ; the ability to run satisfactorily for long periods, idling or on light loads, with full power instantly available ; total enclosure of all working parts ; adequate trouble-free lubrication and cooling arrangements and ease of maintenance are all inherent features of these engines.

Water cooled and air cooled types are available and all models may be adapted to run on petrol or paraffin as desired.

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Ref. W.S.S. 285/7/54

Printed in England

CONSTRUCTION

There are three types of engines all of which are, fundamentally, similar, being single cylinder, side valve, four-stroke units. Two of them are water cooled and one is an air cooled engine.

Model W.D. is of 1½ to 3 B.H.P. and Model W.L.B. is of 2¼ to 5 B.H.P. Both of these are water cooled and, except for bore sizes, petrol tank and hopper capacities, weights and speed ranges, they are identical.

The cylinder dimensions of the air cooled model are the same as those of the W.L.B. A fan and cowling are added and the cylinder barrel is separate from the crankcase. Valve governor, carburation and vaporiser details differ from the water cooled jobs, but, in the main, the designs resemble each other closely.

Principal dimensions and speed-ranges will be found in the tables given on page ~~00~~*, while tables showing overall dimensions and information useful when installing the engines are on page ~~00~~.*

Water Cooled Engines

In the water cooled models, a particularly rigid casting forms the crankcase and cylinder barrel.

A one-piece crankshaft is carried on two, long, plain bearings, one fitted into the starting handle side of the crankcase and the other in a cover plate on the flywheel side. At either end is an oil seal and a retaining plate, while a gasket makes the cover plate joint.

Timing Gears

Also housed within the crankcase are the timing gears, the governor mechanism and the magneto driving gear. In the timing gear, a pinion threaded over the crankshaft is dowelled to one of the crankweights and meshes with the cam wheel. This is formed with the camshaft which rotates on a shaft located in the crankcase and held by a grub screw. The camshaft carries the governor weights which are pivoted on vertical pins fitted into bosses on the inner side of the cam wheel.

Governor

A horizontal spindle, secured by a grub screw in the crankcase casting, forms the pivot for the governor arm which is controlled by a coil spring and actuated by a short actuating shaft located within the hollow camshaft. As the engine speed rises, this shaft is moved outwards by the action of the governor weights. Its outer end pushes against an adjuster in the lower extremity of the governor arm, causing this to pivot and operate — from its upper end — a butterfly in the inlet port of the engine.

Crankcase Details

A cover plate, with a gasket, closes the timing chest, there is a plate and gasket covering the water jacket at the front of the engine and below it is yet a third plate and gasket closing the lower part of the crankcase and housing the oil filler cap and dip stick. A water drain tube with its cap and plug are screwed into a boss on the timing side of the engine crankcase, the boss being sealed by means of a domed disc. At the front and on the timing side are two square-headed drain plugs for sump oil drainage.

Tappets and Valves

Two adjustable tappets bear direct on the cams and slide in bores in the cylinder casting ; there are no tappet guides. The valve springs are retained on the valve stems by collars and pins and the valves also slide in bores without guides. A cover and gasket, held by a single bolt, gives access to the tappet adjustment. Two plugs close the holes below the tappet bores.

Connecting Rod and Piston

A split big end with shell bearings is attached to the crankpin by two bolts and self-locking nuts which also anchor an oil scoop. The H. section connecting rod has a bushed small end which is attached to a fully floating gudgeon pin retained by circlips in the flat topped piston which has two compression rings and an oil scraper ring.

Cylinder Head

The combustion head is formed on the underside of the finned water hopper which is secured to the cylinder by blind ended brass nuts. A copper and asbestos gasket is used between the head and the cylinder.

Where tank cooling is employed, a separate cylinder head, an extra gasket and a cylinder head cover are provided. These are held to the cylinder studs by ordinary nuts and washers and a water connection is screwed into the centre of the head cover.

Fuel Tank and Silencer

On the hopper type, the fuel tank is strapped to the side of the hopper, while on the tank-cooled type, the tank is held to the cylinder head by extra brackets. Single or double compartment tanks are available for use with petrol or petrol-paraffin.

A cylindrical silencer mounted on a central tube which screws into the cylinder casting has a perforated baffle and may be taken apart for cleaning.

Ignition and Lubrication

The magneto is equipped with an impulse starter and is driven through a coupling by a gear meshing with the cam wheel and rotating on a shaft held in an extension of the cylinder casting by a grub screw. Current is taken to a sparking plug which is screwed at an angle into the hopper head or horizontally in the tank-cooled engine.

Lubrication is entirely by splash. Oil is poured into the sump to the level indicated by the dip stick. The scoop below the big end of the connecting rod distributes oil to the cylinder walls, gudgeon pin and big end bearings and timing gear. Oil also falls on to the arms of a tray which lead the lubricant to the main bearings.

Carburettor and Vaporiser

Where the engines are being run on straight petrol, a simple carburettor is employed. It comprises a bottom feed float chamber with a jet block which screws into the intake pipe which is flange mounted on to the cylinder casting. A butterfly valve is operated by a handle held at the desired opening by a spring loaded plunger and a serrated quadrant.

Where starting is on petrol and a change over to paraffin made for normal running, the float chamber is fed by either of two pipes from the double compartment tank through a three-way tap. The intake, to which the float chamber is connected, is similar to the one already described, but is formed integrally with a vaporising chamber which is secured to the cylinder and has one end passing over the exhaust stub. A hole in the side of the stub permits the exhaust gas to escape into the vaporiser, heating it and the intake, thus assisting in the atomising of the paraffin fuel.

Flywheels, Pulleys, Starting Handle

Engines can be fitted with one or two flywheels of varying weights and a pulley can be mounted on either end. Right-hand drive (rotating the starting handle clockwise) is standard, but left-hand drive can be arranged if required.

Air Cooled Engine

Crankcase, crankshaft, timing gear, ignition and lubrication are all the same as on the water cooled engines. A separate finned cylinder is bolted to the crankcase at four points and a detachable cylinder head is secured to the cylinder by eight studs and nuts with a copper-asbestos washer between head and cylinder. There is a paper washer between the cylinder and crankcase.

A rather different carburettor has its jet chamber flange fitted to a curved intake bracket. Governor details are altered to suit the different lay-out and, where paraffin is used for normal running, a special vaporiser draws hot air from the cylinder and feeds it through the air intake of the carburettor.

The valves of this engine have guides and are operated by tappets similar to those already described.

Flywheel and Fan

On this unit, the flywheel incorporates a fabricated steel fan and this revolves in an air duct which directs cold air on to the side of the cylinder and over the cylinder head, a special cowling enshrouding most of the cylinder and head.

A larger silencer is used and there is a breather to crankcase.

Details of construction and differences will be noted later when dealing with maintenance, but the foregoing is a general description of these engines and, in conjunction with the illustrations, should help those unfamiliar with Wolseley engines to understand them and keep them in proper condition.

INSTALLATION

A firm base and one which will not distort or subside with use is essential. A concrete block not less than 2-ft. 6-in. square and 1-in. thick may be used and this or any other base must be perfectly level. The engines may be secured to heavy wooden battens measuring at least 4-in. x 3-in., and these must be bolted firmly to the floor.

Operators will, of course, mount the engines at a height to suit their convenience, not forgetting to provide adequate clearance for the largest available flywheels. Do not forget that too low a mounting will make the use of the starting handle more difficult than necessary and be quite certain that the space on the starting handle side is not unduly cramped.

Where an engine is to be used inside a building, mount it, if possible, in a spot from which it will be easy to carry the exhaust to the outside. An extension to the exhaust system may be arranged by connecting a 1-in. gas pipe to the silencer by means of a socket instead of the nut fitted normally to the silencer.

Support this pipe thoroughly so that no strain whatever is thrown on the engine connection and position the pipe in such a way that no water — either from rain or condensation — can drain back down the pipe to the engine.

In lining up for pulley drive, the engine may be lined up by means of the flywheel. If a fast and a loose pulley are used, the fast or driving pulley should be lined up with that half of the engine pulley nearest the flywheel.

During use, check the holding down bolts from time to time and secure them if they have slackened off. This applies, particularly, where an engine is mounted on a trolley.

RUNNING INSTRUCTIONS

Lubrication

On all these engines, lubrication is entirely automatic, but, since this item is all-important, it is imperative that the level of oil be maintained between the high and low marks on the dip stick. Use only clean oil (from a sealed container if possible) of the correct grade. We recommend the use of a high grade motor oil such as S.A.E.30 for winter and S.A.E.40 for summer. Ensure that the oil is suitable for use in Water Cooled or Air Cooled Engines, whichever applies.

Over-filling with oil will only cause a dirty engine and result in faulty running, fouled plugs and piston rings. Running with the oil level too low will cause overheating and possible seizure of the engine and ruination of the bearings. Ensure that the hole returning oil to the scoop channel is free from obstruction. This is very important as it controls the automatic oil level in the crankcase.

Examine the level every twenty hours and top up if necessary. Drain the engine of oil after every 100 hours of running, flush the crankcase with paraffin, allow this to drain off thoroughly, replace the drain plugs and refill with clean, new oil to the correct level ; the oil capacity of the engine is two pints. The oil will drain away more readily when the engine is warm, but allow sufficient time for oil to clear from the upper and more remote parts of the engine.

Where an engine has been out of use for a long time, it will be as well to remove the crankcase inspection cover and lubricate the bearings from an oil can before starting.

Fuel Tanks

The single compartment tank used on an engine run on petrol only, holds eleven pints of spirit. Double compartment tanks hold 2½ pints of petrol and 8½ pints of T.V.O.

Should there by any signs of fuel starvation, the filters should be examined and cleaned if necessary. See, also, that the air vent hole in the filler cap is always clear.

It should be unnecessary to remind users to take care that petrol and paraffin always find their way into their correct compartments.

Cooling System

In hopper cooled models, water is filled to within 2-in. of the top of the hopper and this level should be maintained by topping-up as evaporation takes place — as it will do rather rapidly when the engine is running continuously. Use soft or rain water where possible, but if hard water only is available and a deposit forms inside the hopper, this may be removed by soda or some other method. After this, the hopper should be drained and washed out thoroughly.

It may be noted that in cold weather the engine will warm up more quickly if the hopper is not completely filled but it should be filled immediately the engine reaches the proper working temperature. **On no account should the engine be started or run unless the cylinder head is completely covered with water.**

In frosty weather do not neglect to drain the hopper and cylinder water jacket by means of the drain plug provided.

Tank cooled engines have upper and lower water connections communicating with the large capacity tank. Since the water circulates instead of being lost by evaporation, topping-up is not required so frequently.

Starting the Engine

With the oil at the correct level in the engine, petrol in the tank and water in the hopper, close the choke by moving the carburettor choke lever to the starting position, that is, away from the engine. Open the petrol tap and depress the tickler on the float chamber until petrol commences to flow. Do not over-flood ; this only wastes petrol and impairs carburation.

A sharp swing, upwards, of the starting handle should start the engine and, providing the engine is in proper condition, it will not, generally, be necessary to swing the handle more than half a rotation. As soon as the engines fires, open the choke fully and leave it open during all running time.

Stopping the Engine

In an emergency, or when the engine is to be stopped only for a short time, use the push-button switch on the magneto. When stopping for the night or other long periods, turn off the petrol tap and allow the engine to run until the petrol in the carburettor has been exhausted. This will ensure a fresh supply and, consequently, easier starting when next the engine is required.

In no circumstances must the engine be stopped by using the choke lever.

Speed Adjustment

The running speed of the engine is regulated by a governor, the principles of which are the same on all engines though details of the air and water-cooled types are slightly different.

As the weights fly outwards under influence of centrifugal force they move the governor actuating shaft which, bearing against the adjuster in the governor lever, rocks this about its pivot. A coil spring controls the movement of the lever, the upper end of which is attached to a butterfly. The amount by which this butterfly is opened is determined by altering the tension of the coil spring.

This is done simply by turning the knurled screw on the side of water cooled engines or above the Intake Bracket on the air cooled engine. Turn the screw in the desired direction to obtain the required engine speed, but in the interests of economy, always run the engine at as slow a speed as will meet the case without causing the engine to labour.

ROUTINE MAINTENANCE

Apart from topping-up oil, water and petrol tanks, draining the oil periodically and keeping the hopper clean as already described, there is little that will be required in the way of routine maintenance.

Sparking Plug

Keep the sparking plug clean by removing it occasionally and wiping or scraping the points clean of carbon or oil. A black, wet, oily appearance of the points indicates either too rich a mixture or undue amount of oil reaching the combustion space. Check that the engine is not being run with a closed or partially closed choke and that the air intake is not choked in any way. If the amount of oiling is excessive and gives rise to frequent misfiring, suspect a worn bore or worn piston rings.

Should the points appear white when the plug is removed, the mixture is too weak and the cause may be a restriction in the fuel system, a dirty filter or a partially choked carburettor jet.

Bad firing or engine stoppage may be due to fouled plug points or shorting of the current inside the plug. This latter can be cured only by taking the plug to pieces and cleaning the insulation and internal parts thoroughly. Dismantle and assemble the plug most carefully, avoiding damage to the insulation. Re-set the points by bending them towards or away from the central electrode. Never bend the electrode. The clearance should be ·015-ins.

Where working conditions are unusually damp, difficult starting may be due to the fact that the outside of the plug is covered in moisture which acts as a conductor and shorts the current. Wipe the plug dry if this has happened — preferably before the expenditure of much energy on the starting handle.

Carburettor

The standard carburettor fitted to water cooled engines has a body attached by a flange to two studs in the cylinder casting. Should the carburettor ever be removed, see that the gasket between the flange and the cylinder is not damaged.

Into the underside of the body the jet carrier is screwed and to this the float chamber is attached. To remove the jet carrier in order to clean the jet, turn off the petrol, disconnect the petrol pipe completely, unscrew the large nut securing the float chamber to the jet carrier. Remove the float chamber, taking care to preserve the two fibre washers, one above and one below the float chamber extension. Unscrew the jet carrier and then the jet from its upper end. In clearing the jet of any obstruction, never poke a wire or anything else through it, the jet size is carefully calibrated and damage, however slight, should be avoided. Blow through the jet and wash it in clean petrol. Wash all parts thoroughly ; remove the float and its needle and clean the needle valve and seating very carefully. Clear out any deposit that may have been formed in the float chamber, wash thoroughly and leave the parts to dry off. Never wipe carburettor parts with a rag which may leave lint behind to find its way, ultimately, to the jet and choke it. While you are about it, take off the air strainer cover, examine and, if necessary, clean the strainer.

Assemble the float mechanism carefully, easing the needle gently through the holes in the spring clip that is soldered to the top of the float and locates in the groove towards the top of the needle. Test the float for free up and down movement after the lid has been screwed down then lock the lid by means of the small hexagon-headed screw opposite the tickler.

Note that flooding of the carburettor may be caused by dirt at the needle valve ; a punctured float will also cause flooding, but is an unlikely contingency.

With the jet firmly in place in its carrier ; screw the latter into the body. Slip one of the fibre washers over the carrier then slide on the float chamber, followed by the second washer and the securing nut. Replace the air strainer and its cover and refit the petrol pipe, being careful to tighten the union nuts without placing any bending strain on the unions.

The same procedure is followed where a vaporiser for paraffin is fitted, but in this case there is a fuel tap beneath the carburettor with a third fibre washer between it and the float chamber securing nut. See that the filter in the tank connection is clean. Flush out all petrol pipes and the three-way tap and refit. Do not remove the carburettor body nor the vaporizer from the engine unless this is absolutely necessary, but, if either of these items have been removed, clean the joint faces carefully and fit new gaskets if there is any risk of their not making a completely air-tight joint.

Carburettor, Air Cooled Engine

Here, again, the body of the carburettor is flange mounted to the intake Bracket, which is in turn mounted to the cylinder, but the jet carrier is in one piece with the nut which secures the float chamber. Fibre washers are used above and below the float chamber extension. In this instrument there is an adjustable stop limiting the closure of the butterfly, or air baffle, operated by the governor mechanism. Thus the idling speed can be

nicely controlled and this is further facilitated by the inclusion of an extra air control, taking the form of a spring-loaded screw with a needle pointed end. Screwing inwards richens the mixture, screwing outwards weakens it. The choke butterfly is operated by a lever which is held in the closed or open position by a spring.

Tappet Adjustment

On both water and air cooled engines, tappet adjustment is identical. It is unlikely that the adjustment will alter accidentally but lack of compression, detected when turning the engine by hand, or other unaccountable loss of power should be followed by an inspection of the tappet adjustment.

Remove the plain cover and its gasket from the rear of the cylinder casting and with a feeler gauge test the clearance between the tappet adjuster and the valve stem ; this should be ·015-in. To reset the adjustment, turn the engine until the point of the appropriate cam is remote from the tappet base and the valve is positively closed. Hold the top or adjuster hexagon and slacken the lower one which is the locknut. Now turn the adjuster in the required direction while holding the tappet with a spanner on the flats provided until the correct clearance is achieved. Hold the adjuster and tighten the locknut. Check again when this has been done. Repeat for the other valve and replace the gasket and cover plate.

Governor

Should the engine not be achieving its full speed range, remove the crankcase inspection cover and examine the adjuster at the lower end of the operating lever. With the actuating shaft within the camshaft as far as it will go, the adjuster on the rocking lever should be just free of the end of the shaft when the knurled speed adjusting nut is at its slackest position. Make the adjustment by slackening the locknut and screwing the adjuster in the required direction.

GENERAL OVERHAUL

Decarbonising Water Cooled Engines

A falling off in power, overheating and "pinking," denoted by a sharp metallic knock, especially when accelerating, will indicate that the engine needs decarbonising.

It is possible to clear the head, valves and piston top of carbon deposit without removing the piston from the engine, but it may be just as well to take advantage of the opportunity provided and lift the piston to examine the state of the rings.

Drain the water from the engine, turn off the petrol and disconnect the fuel pipes ; remove the fuel tank. Disconnect the lead from the magneto to the sparking plug and remove the plug.

On hopper cooled models, remove the brass nuts holding the hopper to the cylinder and lift the hopper away clear of the studs. In the case of tank cooled engines, ordinary nuts with plain washers retain the head. Unscrew these, disconnect the top water connection, lift the head cover and gasket, then the head.

Beneath the hopper in the one case and the shallow head in the tank cooled engine, is a copper and asbestos gasket which must not be damaged.

Valve Removal

Remove the silencer and the square cover and gasket on the same face of the engine. Compress the valve spring by means of a valve spring compressing tool, take out the pin from below the collar at the base of the valve stem, remove the collar, compressing tool, valve spring and valve. Mark each valve in order to ensure its replacement in its original place.

Piston Removal

Remove the crankcase inspection cover which combines the oil filler and dip stick. Turn the engine until the big end bearing cap becomes accessible, then remove the cap nuts, oil dipper and bearing cap. Now push the connecting rod upwards and lift it and the piston out from the top of the cylinder.

If the rings are perfectly free in their grooves, unbroken and obviously gas-tight when working, leave them alone. Should they be badly fouled, scored or broken, remove them, clean out the ring grooves thoroughly and fit new rings. A handy tool for cleaning out ring grooves can be made from a piece of old ring thrust into a file handle and sharpened to a chisel point at the business end. Scrape the carbon carefully from the piston crown and from the top and undersides of the valve heads.

Should the piston be removed from the connecting rod, mark it so as to be certain that it goes back the same way round. All the time these parts are being attended to, cover the openings in the engine to keep out dirt.

Remove all traces of carbon, clean all joint faces scrupulously, fit only perfect gaskets and smear the parts lightly with clean engine oil before replacing them. Fit the head gasket so that the folded over part is uppermost.

Be certain that the shell bearings in the big end are in perfect condition and contrive not to drop or damage them when removing the connecting rod. During this operation take care, also, not to bend the arms of the oil tray which directs oil to the main bearings and is attached to the inside of the crankcase casting by two countersunk screws at the top of the inspection opening.

When replacing the cylinder head or hopper see that it seats properly and tighten down the nuts progressively a little at a time in order to guard against distortion.

Valve Grinding

Pitted or worn valve heads or seats will need grinding, but unnecessary grinding should be avoided since, if overdone, it will form a pocket in the seat and diminish the effective opening. Smear the valve seat with a little valve grinding compound and, with a screwdriver or special tool, oscillate the valve, pressing down meanwhile. Occasionally, lift the valve, turn it slightly while off its seat and bring it down into a different position. Continue until a smooth unpitted ring is formed ; wipe away all trace of grinding compound.

Decarbonising, Air Cooled Engine

Remove the petrol tank and pipe, the cylinder cowling, sparking plug and silencer. Unscrew the speed regulating screw from the lug on the intake bracket, disconnect the link from the governor arm to the carburettor control and remove the intake bracket and carburettor from the engine by unscrewing the nuts at the flange ; do not damage the flange gasket when removing it.

Remove the nuts and washers which hold the cylinder head in place and lift the head carefully from the studs. Lift away the copper-asbestos gasket, then undo the nuts from the cylinder base and lift the cylinder gently from its studs clear of the piston. Catch the piston as the cylinder clears it to prevent it from swinging and causing damage to the skirt. There is a paper washer between the cylinder base and the crankcase and it will be better to replace this with a new one rather than to refit the old when assembling.

With the cylinder clear, it will not of course be necessary to disturb the connecting rod from the crankshaft but while removing carbon from the piston, or indeed, all the time the cylinder is not in place, pack the space around the connecting rod with clean rag to prevent carbon and other dirt from entering the crankcase. Proceed as already described with the removal of carbon and attention to the valves, these will come away with the cylinder, leaving the tappets in the crankcase casting.

Tappet Removal

Tappets on both air and water cooled engines may be replaced when the cam wheel has been removed — see paragraph " Changing Governor Weights " — by taking out the camshaft spindle which is released by unscrewing the Allen type grub screw which secures it in the crankcase casting.

When assembling the camshaft spindle and the magneto drive gear spindle, push them into position until the flats on them can be observed through the screw holes, screw in the Allen grub screws, making sure they locate on the flats, and tighten them home.

Changing Governor Weights (Water Cooled Engines only)

Heavier or lighter governor weights as desired may be fitted as follows :

Remove the flywheel if one is fitted on that side of the engine and then remove the round timing gear cover and its gasket. Set the timing gear so that the dots on the wheels coincide with each other. Remove the tappet cover and the split pin from the screwed end of the speed adjuster screw. Unscrew the latter from the L-shaped piece and withdraw the screw from the spring and governor arm. Remove the small Allen type grub screw which locates the governor arm spindle in the crankcase casting ; remove the cotters and washers and withdraw the spindle and arm. Withdraw the camshaft, knock out the pins on which the weights pivot, remove the weights and fit the new ones.

In assembling the timing gear mesh the wheels so that the two dots on the cam wheel are opposite the dot on the gear on the crankshaft while the single dot on the cam wheel is opposite the dot on the magneto wheel.

Crankshaft Removal and Replacement

Remove the inspection cover containing the oil filler and detach the big end bearing cap as described earlier. Push the piston up the bore as far as it will go. Remove the starting handle sleeve, the starting handle screw and the oil seal retaining plate which is held by three screws. From the opposite side of the engine, remove the pulley, flywheel, and main bearing housing. On the water cooled engine, the pulley is held to the flywheel by three set pins screwed in from the engine side of the flywheel, whereas on the air cooled engine the pulley is fixed directly to the crankshaft. A key secures the flywheel to the crankshaft and is visible when the pulley has been removed. To prevent damage to it, remove the forked oil plate mentioned earlier and which is held by two countersunk screws just above the inspection opening. Be careful not to drop into the sump, the clamp piece which is released when the two screws are removed.

Remove the oil seal retaining plate and the oil seal from the main bearing housing, then remove the housing from the crankcase casting. There is a paper washer between the joint faces of the housing and crankcase.

The crankshaft can now be withdrawn, bringing with it the driving gear which is dowelled to the web of the crankshaft. Take care to hold the connecting rod well out of the way while withdrawing the shaft.

This work would be done only if it became necessary to renew main bearings or oil seals. Opportunity should

be taken to clean out the interior of the engine, including the oilways leading to the main bearings.

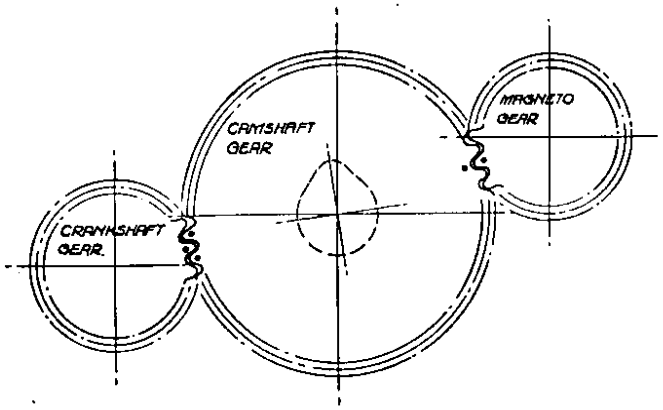
In rebuilding, fit the crankshaft gear to its dowells, should it have been disturbed, in exactly the same position from which it was removed. Always mark the gear before removing it to ensure its correct replacement. Remove the timing gear inspection cover, then slide the crankshaft into the fixed bearing. As the shaft goes home, see that the timing marks coincide with those on the camwheel ; they will do so when the **crankshaft is at bottom dead centre.** Incidentally, bottom dead centre is denoted when the keyway in the crankshaft is at the top. Release the timing gear inspection cover. Fit the loose bearing housing on the opposite end, not forgetting, first, to thread on the paper joint washer — preferably a new one. Refit the big end and bearing cap and make sure that the oil dipper does not foul the sides of the oil channel formed in the base of the sump. Replace the oil plate above the crankshaft, screw back the inspection cover and its gasket. Now deal with the oil seals and their retaining plates, the flywheel and pulley. Screw in the drain plugs which will have been removed to clean out the engine, fill up with new oil.

Magneto

The ignition is timed correctly before the engine is sent out and no alteration to this should be made. In the contact breaker the points are adjusted to open ·010 to ·012-in. and a periodic inspection should be made to ensure that this gap is being maintained.

Should the magneto break down it should be attended to only by an expert. Its removal and replacement are quite simple so long as it be understood that it must be replaced in exactly the same position as it originally occupied.

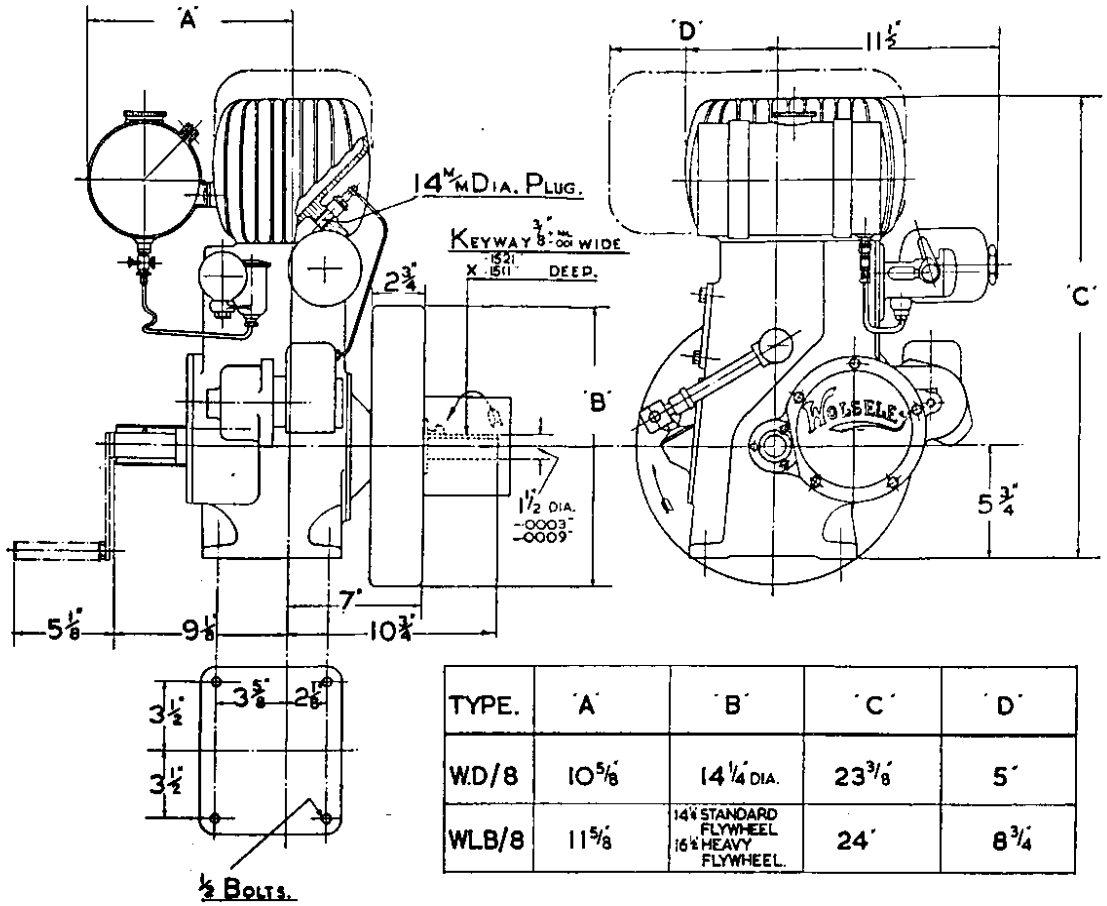
In replacing the magneto, first turn the flywheel key to the top of the crankshaft, then, with the magneto flange towards you, rotate the driving dog in a clockwise direction until you contact the impulse stop. Put the coupling in position on the magneto driving gear. Now rotate the driving dog away from the stop until the dogs enter the coupling. Replace and tighten the fixing nuts. The timing should now be checked as follows : Rotate the crankshaft until the flywheel key is at its lowest position. This indicates T.D.C. of the piston, and the magneto contacts should break at this position.



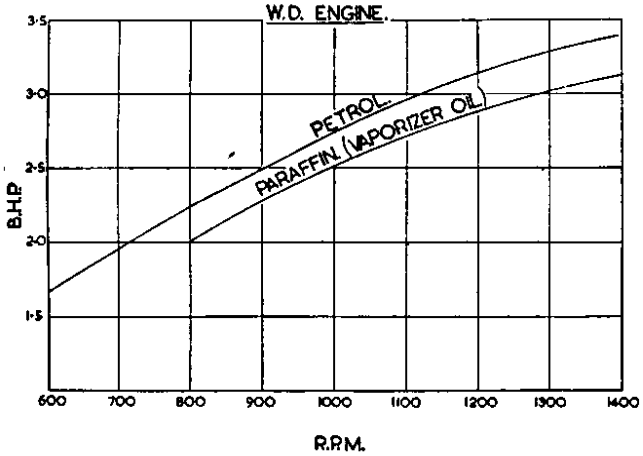
TIMING GEAR DIAGRAM.

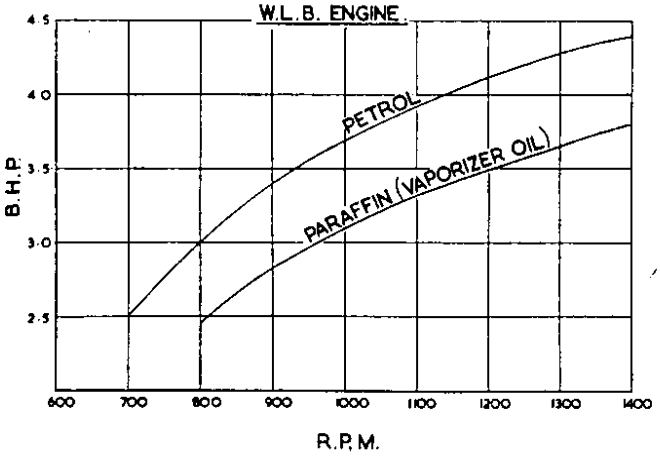
With L.H. rotation engines, the procedure is identical except that the driving dogs should be rotated anti-clockwise to contact the impulse stop.

If the gear wheels should be displaced inside the crankcase for any reason they are marked for re-timing. The camshaft gear wheel is marked with two dots where it meshes with the crankshaft gear, and one dot where it meshes with the magneto driving gear. This is illustrated in the above diagram.



TYPE.	A	B	C	D
W.D/8	10⅝	14¼ DIA.	23⅜	5
W.L.B/8	11⅝	14¼ STANDARD FLYWHEEL 16¼ HEAVY FLYWHEEL.	24	8¾





	Hopper Cooled	Tank Cooled
Bore	3″	3″
Stroke	3½″	3½″
Petrol Tank Capacity ...	8½ pints	8½ pints
Lubricating Oil capacity ...	2 pints	2 pints
Hopper capacity	1½ galls.	—
Water Tank capacity ...	—	16½ galls.
Water Tank dimensions ...	—	14″ i./dia. × 2′6″ high
Std. Pulley bolted ...	5″ dia.×4½″ wide	5″ dia.×4½″ wide
Special Pulley to ...	3½″ dia.×5″ wide	3½″ dia.×5″ wide
Special Pulley flywheel ...	8″ dia.×5″ wide	8″ dia.×5″ wide
Nett weight with 5″ Pulley	224 lbs.	212 lbs. (without water tank)

	Hopper Cooled	Tank Cooled
Bore	3⅜″	3⅜″
Stroke	3½″	3½″
Petrol Tank capacity ...	11 pints	11 pints
Lubricating Oil capacity ...	2 pints	2 pints
Hopper capacity	2½ galls.	—
Water Tank capacity ...	—	16½ galls.
Water Tank dimensions ...	—	14″ i./dia. × 2′6″ high
Std. Pulley bolted ...	5″ dia.×4½″ wide	5″ dia.×4½″ wide
Special Pulley to ...	3½″ dia.×5″ wide	3½″ dia.×5″ wide
Special Pulley flywheel ...	8″ dia.×5″ wide	8″ dia.×5″ wide
Nett weight with 2 Standard wheels and 5″ pulley	276 lbs.	272 lbs. without water tank
Nett weight with 2 heavy flywheels and 5″ pulley...	346 lbs.	342 lbs. without water tank