SERVICE SHEETS

B.S.A. 1947

Winged Wheel

November, 1953

In preparing this Manual, we have endeavoured to offer the greatest possible assistance to those who are called upon to maintain and repair the B.S.A. Winged Wheel, thus ensuring that these units give the long and trouble-free service normally associated with B.S.A. products.

All dimensions, clearances, etc., normally required by repairers, have been included, and reference to the headings under the left hand column of each sheet, will show the sequence in which various repair operations can best be carried out with the greatest economy in labour.

This is essentially a Workshop Manual. The various operations have been described with the assumption that the reader has experience of engine fitting and is able to work to the fine tolerances involved. It is not advised that inexperienced personnel should undertake major overhauls, as serious damage may easily result.

The instruction book supplied with each Winged Wheel gives all the necessary information required for efficient operation and normal maintenance.

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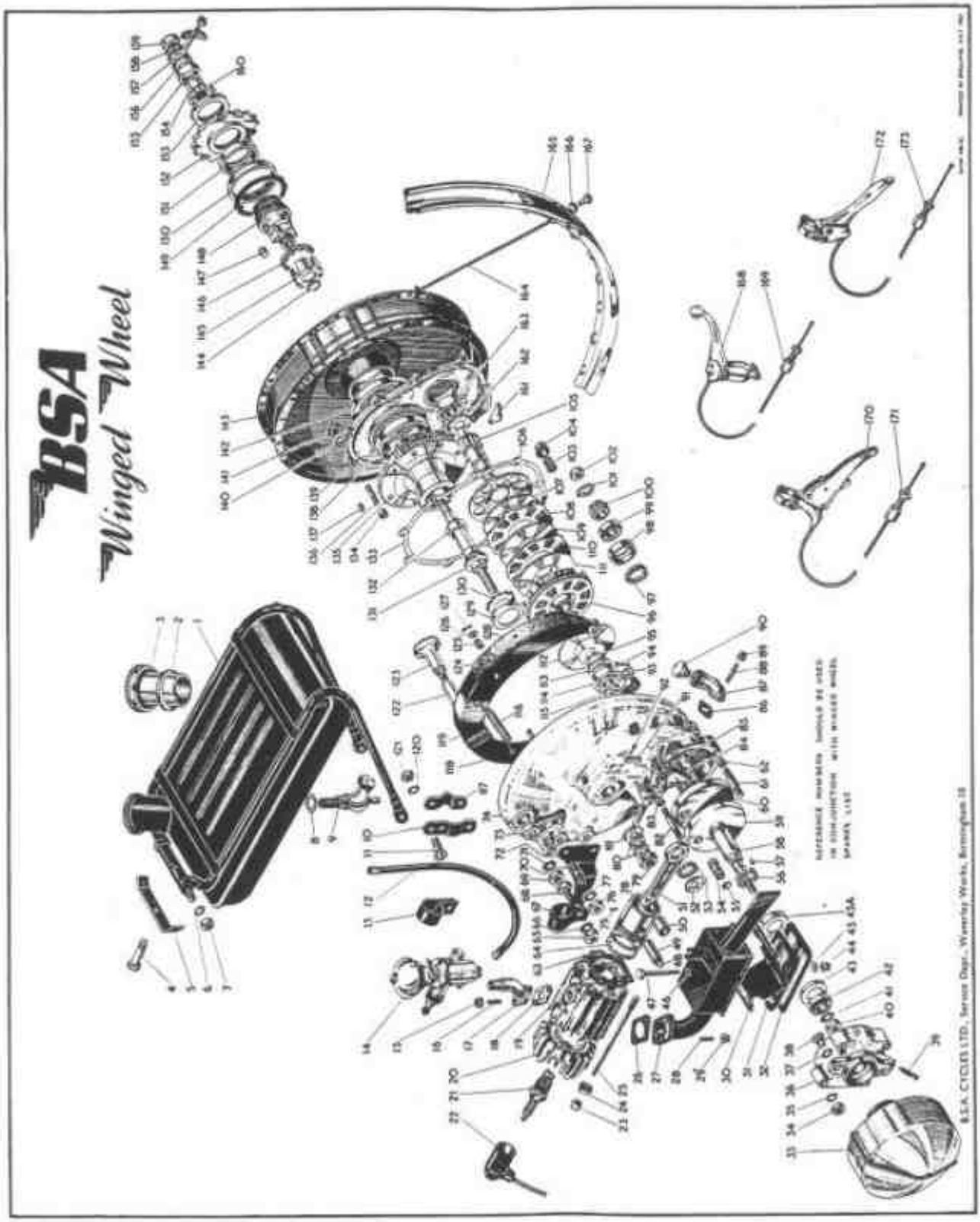
SERVICE SHEET No. W101



SERVICE SHEET No. W102

November, 1953

MODEL W1 WINGED WHEEL

THE PETROIL LUBRICATION SYSTEM

The proportion of oil to petrol recommended for the engine petroil lubrication system is two filler cap measures of oil to half a gallon of petrol and an S.A.E.50 oil is specified.

This recommendation is approximately equal to 25 parts of petrol to one of oil and it is important that this proportion is adhered to.

It is preferable for oil to be thoroughly mixed with the petrol before it is poured into the petroil tank. If this is not possible the machine should be rocked to and fro after the oil is added to the petrol to ensure that it is thoroughly mixed before the engine is started.

When the engine is parked, the petrol tap must be turned off. Failure to do this may result in the carburettor float chamber becoming filled with oil if the machine is allowed to stand for a long period. In hot weather it may be advantageous to turn off the petroil tap just before stopping so that the carburettor is emptied.

Oil is induced into the crankcase through the carburettor in the form of oil mist mixed with the fuel supply. When the piston descends, compressing the charge in the crankcase, most of the oil mist separates out and is deposited in the crankcase as liquid oil, while the petrol and air pass up through the transfer ports into the combustion chamber. It is for this reason that it is most important that the grade of oil specified is always used, as an oil of lower viscosity may not be deposited on the crankcase walls in sufficient quantities, thus affecting the efficiency of the lubrication system.

Surplus oil is carried by the action of the fuel transfer to the combustion chamber, where it serves as an upper cylinder lubricant and is eventually burned by the heat of the combustion.

There is no point in increasing the proportion of oil to petrol above that recommended, since any excess of oil is merely transferred to the combustion chamber where it is burnt, and it will be obvious that a higher proportion of oil means a lower proportion of petrol and therefore a less suitable combustible mixture.

Since the only lubrication provided is by means of the oil contained in the fuel, long downhill runs with the throttle closed may cause oil starvation. In these circumstances, the throttle should be opened occasionally to allow a quantity of petroil to be drawn into the engine.

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BSA SERVICE SHEET No. W103

November, 1953

MODEL W1 WINGED WHEEL

ADJUSTMENTS WHICH CAN BE CARRIED OUT WITHOUT DISMANTLING

Sparking Plug

The sparking plug is of such importance in obtaining satisfactory engine performance that it is advantageous to give proper attention to this component. It is poor economy to use any but the most efficient plug. The better plug will soon pay for itself by effecting more complete combustion and maximum development of power from the fuel supply. Reduced power due to partially unburned fuel will be eliminated. Engineering tests show that the plug most suited to the requirements of this engine is the Champion N.7. Remove the sparking plug every 500 miles (800 km.) or so for inspection. If the carburation system is in correct adjustment the sparking plug points should remain clean almost indefinitely. An over-rich mixture from the carburettor will, however, cause the formation of a sooty deposit on the points and, later, outside the plug body (as upper view, Fig. W1). If, therefore, such a deposit is found, clean it off carefully and check the carburettor. Too heavy a proportion of oil in the petroil mixture will also cause plug fouling. The continued use of leaded fuel may also eventually produce a deposit on the plug—this time of a greyish colour.

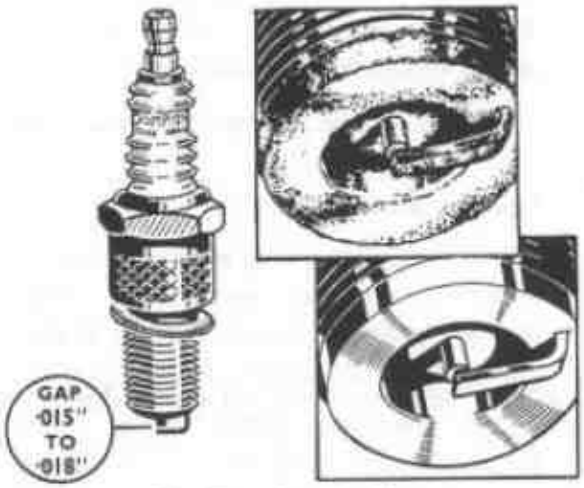

Fig. W1. Sparking Plug

A light deposit due to any of these causes can easily be cleaned off, but if it is allowed to accumulate, particularly inside the body, the plug may spark internally with an adverse effect on engine performance—if, indeed, it does not stop the engine altogether—and the plug should be taken to a garage for cleaning. If eventually the cleaning process fails to restore the plug to its original condition of efficiency, it should be replaced by a new one.

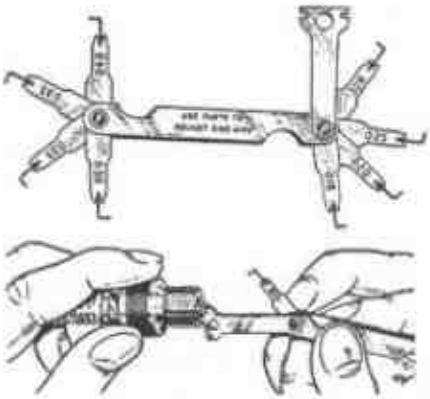

Fig. W2. Sparking Plug Gauge

When inspecting a plug, also check the gap between the points. This should be .015 - .018 in. (.38 - .45 mm.), and adjustment should be made by bending the side wire (Fig. W2).

Never attempt to move the centre electrode.

Contact Breaker adjustment

Removal of the Flywheel Magneto domed cover gives access to the magneto and the contact breaker points can then be seen through the aperture in the flywheel. Turn the engine until the breaker points are fully open and check the gap with feeler gauges. This gap should be .018 in. and if there is any appreciable deviation, the points must be readjusted.

To carry out this adjustment, slacken the locking screw (B. Fig. W3) and rotate the eccentric screw (C) until the gap is correct. Tighten the locking screw and recheck the gap. The breaker point setting should only be adjusted in the manner described and in no circumstances should the fixed contacts be loosened or the breaker arms bent to provide adjustment.

If any further Magneto Servicing is necessary, Service Sheet W108 should be consulted.

Ignition Timing

If the ignition setting appears to require attention, the contact breaker gap should first be checked as described above, as this setting affects the ignition timing.

To check the ignition timing, rotate the engine until the piston is at Top Dead Centre which can be judged by means of a small rod inserted through the sparking plug hole to determine when the piston reaches its highest point. Rotate the engine backwards until the piston has moved down the barrel 5/32 in. from its T.D.C. position. The contact breaker points should then be just on the point of opening, *i.e.*, about .0015 in. apart.

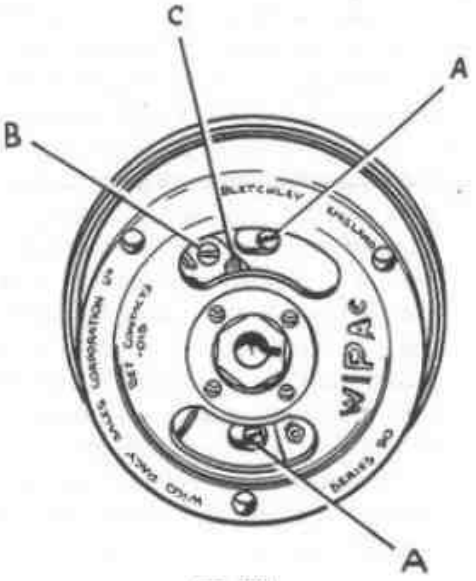

Fig. W3

If the timing is not correct, the screws (A. Fig. W3) should be slackened, the magneto backplate rotated until the setting is correct, and the screws retightened. Rotating the backplate in a clockwise direction advances the ignition.

A good method of determining the point at which the contact breaker points are just about to open is to place a piece of fine tissue paper, such as a cigarette paper, between them and adjust the ignition so that the setting is correct when the paper is just lightly gripped by the contacts.

Crankcase Drain Plug

If an excess amount of oil or petroil mixture is inadvertently deposited in the crankcase, it may be drained off by removing the screw headed drain plug, situated in the bottom of the crankcase just behind the flywheel magneto backplate, and rotating the engine a few times. Ensure that when the plug is replaced it is tightened fully.

Clutch Adjustment

The only adjustment necessary on the clutch is to the operating cable. This is carried out by means of the screwed adjuster at the lower end, which should be adjusted to allow about 3/32 in. slack at the handlebar lever end of the cable when the clutch is released. Care should be taken to ensure that this slack is never allowed to disappear as this will mean that the clutch push rod would be subjected to continual thrust resulting in rapid wear and clutch slip.

Hub Bearing Adjustment

Only one adjustment is necessary on the hub ballraces and this is provided on the right hand side of the spindle. To carry out this adjustment, slacken the spindle retaining nut (A. Fig. W4) on the right hand side of the engine unit and the adjusting cone locknut (B). The cone (C) can then be adjusted, and this adjustment should be carried out so that with the locknut (B) and spindle retaining nut (A) retightened, there is just perceptible play (*i.e.*, about 1/64 in.) at the wheel rim. This may be judged by screwing in the cone until resistance to free-wheeling of the sprocket can be felt and then unscrew the cone about a quarter of a turn before tightening the locknut. The amount of play at the wheel rim must always be the final test and it is most important that this adjustment is accurately carried out.

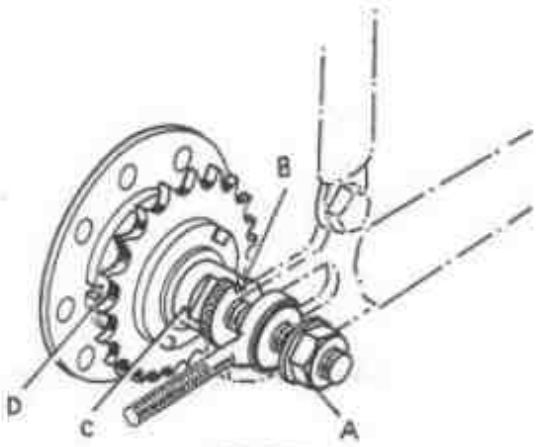

Fig. W4

Brake Adjustment

Brake adjustment is by means of a screwed cable adjuster in the brake plate. Care should be taken to ensure that the brake does not bind as it will then absorb a considerable amount of power.

BSA SERVICE SHEET No. W104

November, 1953

MODEL W1 WINGED WHEEL

ENGINE DISMANTLING FOR DECARBONISING

When undertaking a top overhaul of the Winged Wheel, there is no need to remove the unit from the frame as all the components are readily accessible in situ.

The need for decarbonisation is usually indicated by loss of power, general roughness and erratic running, particularly at small throttle openings. Complete dismantling of the cylinder head is not always necessary and the following periods between decarbonising are recommended :—

Exhaust Port and Silencer	...	...	1,000 - 1,200 miles.
Cylinder Head and Piston	...	...	2,000 - 2,400 miles.

Any carbon in the exhaust system restricts the flow of the gasses and thus directly affects the efficiency of the engine. Particular care should therefore be taken to ensure that the exhaust port and silencer are properly cleaned during decarbonisation.

Exhaust Port and Silencer

To dismantle, slacken the crankcase nut (C. Fig. W5) retaining the slotted silencer clip and remove the two self-locking stud nuts (B) which retain the exhaust port flange. The complete silencer can then be withdrawn downwards from the engine unit, taking care that the jointing washer (A) is not damaged. Removal of the self-locking nut (D) enables the bottom of the silencer together with its sealing washer (E) to be removed, thus exposing the silencer baffle (F) which can be pulled free from the silencer body.

Fig. W5. View into port with pipe off and silencer dismantled

All parts of the silencer and exhaust pipe should be scraped free of carbon and particular attention should be paid to the section of the exhaust pipe near the cylinder.

The cylinder exhaust port can next be attended to. Rotate the engine until the piston, as seen through the exhaust port, is at the bottom of its travel, at which point the exhaust port is completely uncovered. The port can then be scraped free of carbon using a suitable tool. If it is not intended to remove the cylinder head, care must be taken to ensure that no carbon is pushed into the cylinder barrel.

Cylinder Head Removal

Remove the ignition lead and sparking plug, undo the four cylinder head retaining nuts (A. Fig. W6) and remove the saddle washers (B). The cylinder head can then be lifted clear of the barrel. Rotate the engine until the piston is at the top of its stroke and using a suitable

tool remove the carbon from the top of the piston and from the inside of the cylinder head. These components are of aluminium and care is necessary to ensure that they are not marked by the decarbonising tool. It is particularly important that the cylinder head joint faces are not scratched as this will affect the compression seal.

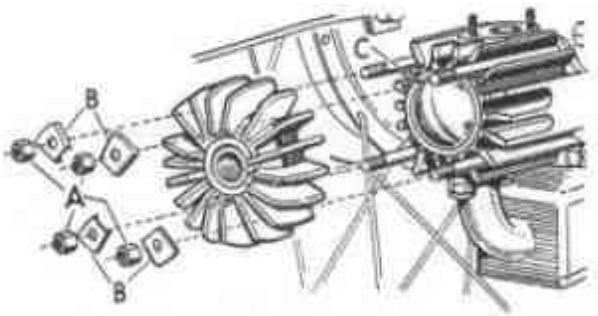

Fig. W6. Head off with piston at t.d.c.

Removal of the carburettor will leave the cylinder free to be withdrawn from the crankcase if inspection of the piston is desired. As the piston emerges from the barrel it should be supported so that it is not damaged when it falls clear.

The piston can be examined without removing it from the connecting rod, but should this be desired for any reason, the circlips should be removed with the aid of a pair of small pliers and the gudgeon pin pushed out with the aid of Service Tool 61-3410. The piston should be suitably supported during this operation in order to avoid any side thrust on the connecting rod. If the gudgeon pin should prove too tight the piston should be warmed by wrapping round it a rag which has been soaked in hot water. This will cause the aluminium piston to expand thus releasing the gudgeon pin.

Re-assembly

Re-assembly is carried out in the reverse order to dismantling. If the gudgeon pin has been removed, then new circlips must be fitted and carefully located in their grooves. New piston rings must be fitted and their gaps correctly set if the old rings show excessive gaps or brown discolouration on their bearing surfaces. Take care that the cylinder head joint is perfectly clean before tightening the retaining nuts.

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An absorption type cylinder of improved design is fitted to later models.

The sound absorption pack (C), Fig. W6A, will eventually become choked, and should be replaced by a new one at intervals of about 5,000 miles. To replace this pack, remove silencer, then take off nut A, Fig. W6A ; this allows the rear end of the silencer body (D) to be seperated from the front end (B), when the old absorption material can be pulled out.

Clean the perforated tube of any carbon or oil, fit the new pack (obtainable from your Winged Wheel dealer) and reassemble.

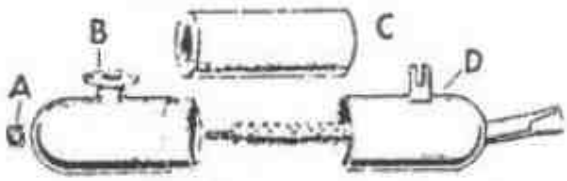

Fig W6A.

Remove any carbon deposit which may have collected in the small flanged inlet pipe before refitting silencer.

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BSA SERVICE SHEET No. W105

November, 1953

MODEL W1 WINGED WHEEL

BRAKE AND FREEWHEEL ASSEMBLY

These components are of exceptionally generous proportions and should not require frequent attention.

To obtain access to the brake mechanism the engine unit must be removed from the brake drum. Disconnect the clutch, brake and electric cables and remove the carburettor by slackening the retaining clip and withdrawing the carburettor from its stub fitting.

Remove the bolt securing the torque arm to the frame clip, slacken the two spindle nuts, and remove the chain. The complete wheel can then be removed from the frame.

Support the crankcase by bolting the crankcase side spindle end to Service Tool 61-3411 or other suitable support so that the wheel is held horizontally with the brake drum uppermost.

Undo the Adjuster Cone Locknut (B. Fig. W7) and remove the cone (C). The complete Sprocket Carrier Assembly and Freewheel mechanism can then be withdrawn followed by the spring which is seated on the spindle. In some cases it may be necessary to pull the dust cover away with the sprocket carrier.

Removal of the retaining circlip will permit the roller retainer and rollers to be withdrawn from the sprocket carrier.

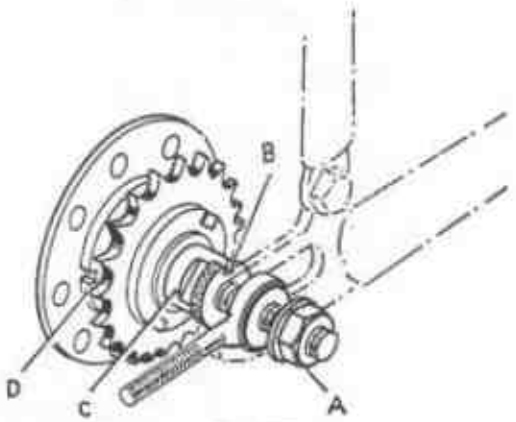

Fig. W7

Hold the dogs of the sprocket carrier in a soft-jawed vice and undo the sprocket locking ring (left-hand thread) using Service Tool 61-3412, and remove the sprocket (right-hand thread) using Service Tool 61-3100. Reassemble the rollers, roller retainer, and circlip ; and replace the sprocket carrier in the hub. Screw up the adjuster cone and cone locknut, finger tight.

The screwed ring (D) retaining the hubs should next be removed. Turn back the locking washer and using Service Tool 61-3412 unscrew the ring, which has a right hand thread.

Remove the ring and lockwasher and then lift the wheel and brake drum off the engine unit ensuring that the two keys in the hub centre are not mislaid. If there is any difficulty in separating these items, remove the crankcase from the support and give the right hand spindle end a few gentle taps with a soft mallet. It is most important that the sprocket carrier is replaced before any attempt is made to remove the brake drum from the engine unit. Also, if the unit is dismantled without the aid of Service Tool 61-3411, or other suitable support, care must be taken to ensure that the weight of the units does not tend to draw them apart except when the sprocket carrier is in position. Failure to observe these precautions may result in damage to the gearcase cover bearing and oil seal which will result in oil leakage from this point.

If oil leakage is suspected, the gearcase cover bearing and oil seal should be inspected to ensure that they are in good condition and correctly positioned. If the above dismantling procedure is not observed it is possible for the bearing to be moved outwards until it is no longer flush with the inside face of the housing. In this position it tends to trap the edge of the oil seal and thus prevent the seal acting. In this case the oil seal should be removed and the bearing (if undamaged) pulled back to its original position using Service Tool 61-3413.

The two brake shoes are now accessible and can be removed by withdrawing the retaining split pins, springs and washers. If the linings are badly worn they should be replaced.

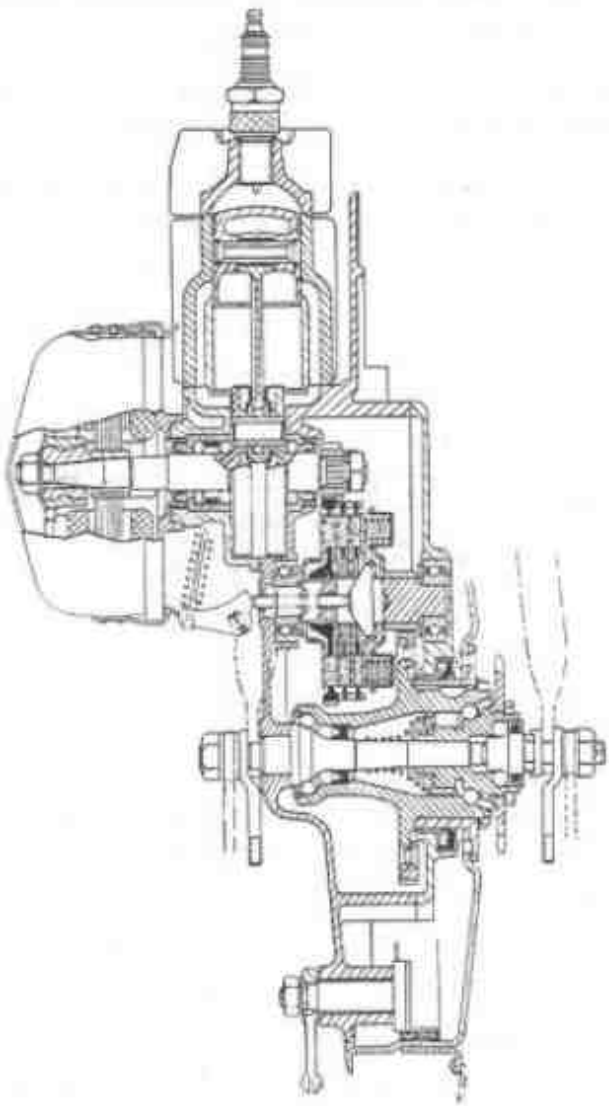

Fig. W8. Sectional View of Unit

Re-assembly should be carried out in the reverse order to that of dismantling. Note that the brake cam should be re-assembled so that the side marked 'OUT' is towards the outside of the drum. In some instances the washers of the spring assemblies which hold the brake shoes in position will not be the same size at each end of the spring. In this case the larger washer should always be fitted against the brake shoe. Ensure that the two keys are correctly positioned before replacing the brake drum, and that the retaining ring is fully tightened before the lock-washer is turned over.

There is no need to remove the sprocket carrier in order to replace the sprocket and lockring as the freewheel mechanism will prevent the sprocket carrier from rotating as the sprocket is tightened. Finally the cone bearing should be adjusted as described in Service Sheet W103.

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BSA SERVICE SHEET No. W106

November, 1953

MODEL W1 WINGED WHEEL

COMPLETE DISMANTLING AND RE-ASSEMBLY

Dismantling

Detach the complete wheel from the frame and remove the engine unit from the brake drum as described in Service Sheet W105.

Reverse the engine unit and secure the right hand side of the spindle in Service Tool 61-3411. Remove the magneto flywheel domed cover and the flywheel central retaining nut. The magneto flywheel can then be withdrawn from its taper using Service Tool 61-1735 (Fig. W9). Make sure that the small locating key is not lost. The flywheel does not require keepers but care should be taken that it is not laid near iron filings or other loose steel particles. Withdraw the contact breaker cam from the mainshaft again ensuring that the small key is not mislaid. Removal of the two large screws from their slotted holes in the magneto backplate will permit this component to be removed.

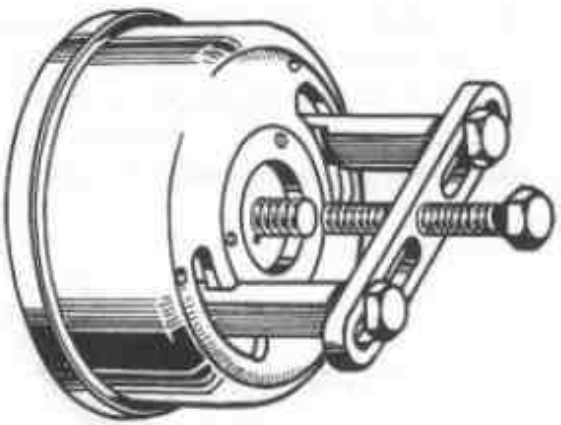

Fig. W9. Flywheel Removal

Note :—If Service Tool 61-3411 is not used to support the engine unit, care should be taken to ensure that the engine unit is not allowed to fall on to the mainshaft, or the flywheel assembly will almost certainly be damaged.

The exhaust system, cylinder head, cylinder barrel and piston should now be removed as described in Service Sheet W104.

Gearcase Dismantling

Remove the unit from Service Tool 61-3411 and replace it so that the gearcase is uppermost. Undo the adjuster cone and withdraw the sprocket carrier. Remove the nine gear cover plate stud nuts ; the cover plate should then come away without difficulty, but if any stiffness is apparent, then the two projections which are provided on the outer cover will assist removal. Take care that the cover is not allowed to tilt as it is withdrawn.

Normally the cover will come away complete with the clutch shaft and hub shell, but in some instances the clutch assembly will remain in the main case. If any difficulty is experienced in removing the assembly the clutch push rod operating lever and clutch push rod should be removed, a $\frac{3}{16}$ in. rod inserted through the clutch push rod hole and used to drive the clutch shaft out of the main case.

The removal of bearings from the aluminium case is facilitated by heating the case in a degreaser, and this procedure must be adopted if a bearing appears to be tight in the case as otherwise the aluminium will be damaged. In cases where the clutch shaft bearings are left

in the case after the clutch shaft has been withdrawn, the case must be thoroughly warmed and the bearings dropped out by gently tapping the case against a wooden bench or other similar object. If a degreaser is not available, the case should be heated by means of rags soaked in boiling water or by immersion in boiling water, although in the latter case any steel components must immediately be thoroughly dried to prevent rusting.

Push back the locking washer on the mainshaft nut and undo the nut using a box spanner, and preventing the flywheels from turning by engaging Service Tool 61-3414 on the teeth of the mainshaft pinion. The mainshaft pinion can then be withdrawn from the mainshaft. If the service tool is not available, the gudgeon pin should be replaced and two equal thickness strips of wood placed across the crankcase, one on either side of the connecting rod to prevent the complete rotation of the flywheels. If this latter procedure is adopted, great care must be taken to see that the mainshafts are not pulled out of line as the nut is undone.

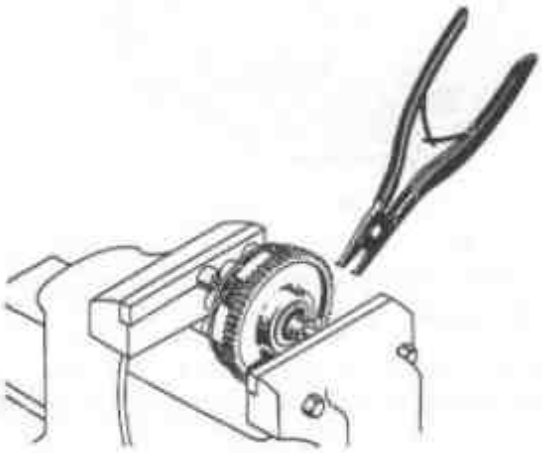

Fig. W10. Clutch Circlip Removal

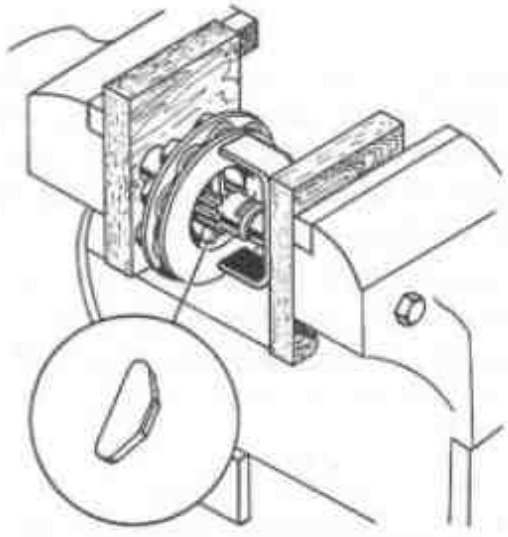

Fig. W11. Compressing Clutch Springs

Clutch Dismantling

If required, the clutch assembly can first be withdrawn from the gearcase outer cover. Withdraw the ballrace from the push rod end of the clutch shaft by means of Service Tool 61-1735 and remove the washer in front of the circlip. Insert the clutch push rod, or other similar length of $\frac{3}{16}$ in. rod, into the push rod hole in the shaft and clamp the assembly in a soft-jawed vice, as shown in Fig. W10, until the clutch springs are fully compressed. Using a suitable pair of circlip pliers, remove the clutch retaining circlip and then pull off the thin washer behind the circlip. Undo the vice and remove the clutch gearwheel and clutch plates.

Remove the clutch push rod and with the aid of Service Tool 61-3417 again compress the clutch springs in the vice as shown in Fig. W11, so that the triangular clutch operating plate can be pulled sideways out of the clutch shaft. On releasing the vice, the remaining clutch components can be withdrawn.

Crankcase Dismantling

Undo the four crankcase stud nuts and remove the crankcase outer half. As the crankcase joint is made with jointing compoint some resistance may be felt and in this case a tap on the back of the drain plug boss with a soft mallet will break the joint. The crankshaft main bearings are of the loose roller type and to avoid the flywheel and driveside rollers becoming intermixed, it is advisable to withdraw the flywheel assembly with the crankcase outer half, taking care that the drive side rollers are not lost as the assembly is withdrawn.

Withdraw the flywheel assembly from the crankcase outer half and remove the two rows of rollers and spacing washer. Some early models are fitted with two separate roller outer races and in this case only the outer row of rollers can be removed. The connecting rod and flywheel assembly is supplied as a unit and cannot be further dismantled.

Prise the oil seal out of the crankcase outer half with a medium size screwdriver, but making sure that there are no sharp edges which might cut the rubber part of the seal. Using Service Tool 61-3415 push the outer roller race from the crankcase outer half.

Early models had two roller races and a spacing washer between them, and these can be pushed out together. If any of the races are tight the case should be suitably warmed. The single outer roller race together with the oil seal can then be pushed out of the inner crankcase in a similar manner.

Re-assembly

Re-assembly is carried out in the reverse order to dismantling. The need for extreme cleanliness cannot be over emphasised. Parts should be thoroughly cleaned and all trace of any anti-rust preparations with which new parts may be coated must be removed. All bearing surfaces should be liberally smeared with engine oil when assembling.

Crankcase Re-assembly

First assemble the clutch shaft bearing into the inner crankcase with the aid of Service Tool 61-3416, warming the case if necessary. Place the drive side oil seal in position in the crankcase and push it home. The fitting of new oil seals involves complete dismantling of the engine and therefore it is false economy to replace old seals during re-assembly unless they have seen very limited service. Position the drive side roller outer race and push it in with the aid of Service Tool 61-3419 making sure that it is square in the housing and if necessary warming the case to assist assembly. Replace the flywheel side roller outer race in a similar manner. If the drive side crankcase was previously fitted with two separate roller outer races, the later type of single outer bearing can be fitted without modification. Do not replace the flywheel side oil seal at this stage.

Assemble the drive side rollers into the outer bearing using a little grease to keep them in place, and re-assemble the flywheel assembly into the driveside crankcase. Care is necessary when passing the mainshaft through the oil seal to ensure that the seal is not cut or distorted.

Assemble the first row of flywheel side rollers in the outer race, with a little grease to hold them in position, and seat the bearing spacer washer on top of the rollers. These bearing spacers are graded in steps of .003 in. thickness, and if the original outer races are to be used the same

spacing collar should be refitted. If new outer bearings have been fitted, a spacing collar should be employed which will allow the crankshaft assembly .003 - .007 in. end float when the crankcase halves are bolted firmly together.

Note :—When bolting up the crankcase halves ensure that too thick a spacing washer has not been selected, or the flywheel assembly will be pinched and the mainshafts forced out of alignment.

When the crankshaft end play is within the above limits, the crankcase halves should be parted slightly and a good quality jointing compound applied sparingly to the joint faces, before again bolting the crankcase halves firmly together. Replace the flywheel side oil seal, taking care to avoid damage when pushing it over the lip on the mainshaft. Push the crankshaft pinion on to its spline, and preventing the flywheel from rotating as during dismantling, tighten the retaining nut and turn over the lockwasher.

Clutch Re-assembly

Place the clutch spring back plate, clutch springs and clutch spring plate in position on the clutch shaft and compress the springs in a vice with the aid of Service Tool 61-3417 so that the triangular clutch operating plate can be positioned in the clutch shaft, then remove the assembly from the vice. Insert a piece of $\frac{3}{16}$ in. rod, approximately $2\frac{1}{2}$ ins. long, into the clutch push rod hole in the clutch shaft and thread the remaining clutch components, including the circlip, over the rod. Place the assembly between the jaws of the vice and compress the springs as during dismantling. Assemble the clutch plates and clutch gearwheel, position the thin circlip washer, and then slide the circlip along the shaft to its locating groove. Ensure that the circlip is correctly located before the spring pressure is released.

Gearcase Re-assembly

Bolt the engine unit to Service Tool 61 - 3411 so that the gearcase is uppermost. Place the thin grit protection washer on the push rod end of the clutch shaft and tap the shaft into its bearing in the inner crankcase. Position the hub centre and sprocket carrier on the main spindle and screw down the adjuster cone finger tight. Push the thick grit protection washer on to the end of the clutch shaft so that its inside bevelled edge is towards the shaft.

With the aid of Service Tool 61-3416 assemble the clutch shaft bearing into the gearcase cover, warming the cover if necessary. Place the gearcase cover in position on its retaining studs and tap it gently home ensuring that it goes on evenly. Replace the retaining nuts and tighten them evenly to avoid distorting the cover.

The remainder of the assembly is as described in Service Sheets W104 and W105.

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BSA SERVICE SHEET No. W107

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MODEL W1 WINGED WHEEL

CARBURETTER

The carburetter fitted to the Model W1 is manufactured by Messrs. Amal Ltd., and has been specifically designed for this type of unit. The carburetter incorporates an ingenious cold starting choke which is operated by the throttle control.

The parts comprising the carburetter are shown in Fig. W12 and the method of operation can be seen from Fig. W13.

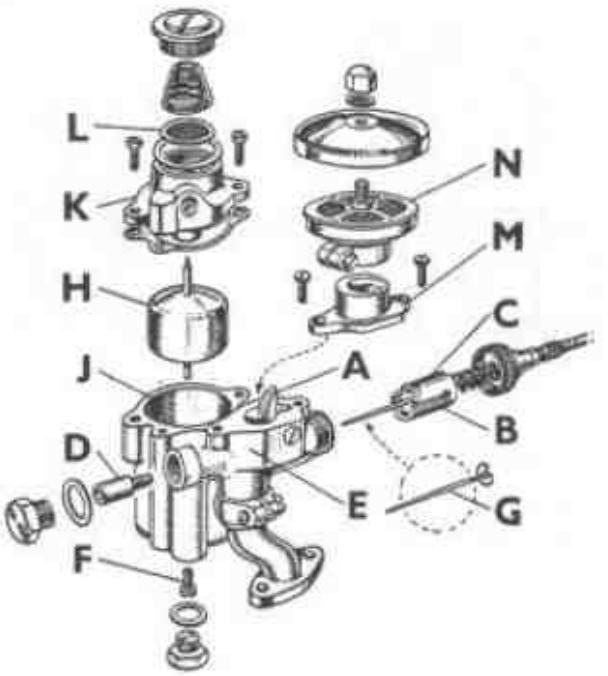

Fig. W12. Amal Carburetter

A. Strangler
B. Throttle Slide
C. Strangler Operating Groove
D. Needle Jet
E. Mixing Chamber
F. Main Jet
G. Needle Jet
H. Float
J. Float Chamber
K. Float Chamber Cover
L. Gauze Filter
M. Carburetter
N. Air Filter

The carburetter is very simple in operation and every precaution has been taken to avoid any possibility of the jets becoming clogged. Fuel passes into the float chamber through a fine filter in the float chamber cover and the level is controlled by the action of the fixed needle in the float.

A drilling connects the float chamber to the main jet from where the fuel passes to the needle jet which opens into the mixing chamber. The amount of fuel which passes through the needle jet is regulated by the tapered needle.

The air supply is drawn into the mixing chamber through the mesh air filter and is regulated by the throttle slide which is connected to the handlebar control by means of a cable. The tapered needle is retained in the slide by means of a circlip, and thus movement of the throttle slide controls both the air and fuel supplies. Mixture control is obtained by means of a number of grooves in the tapered needle. The circlip may be secured in any one of these and thus enables the needle to be raised or lowered relative to the throttle slide. The normal position for the circlip is the third notch from the top. Placing the circlip in the first or second notch lowers the needle and restricts the fuel supply, thus providing a weaker mixture. Conversely, raising the needle richens the mixture.

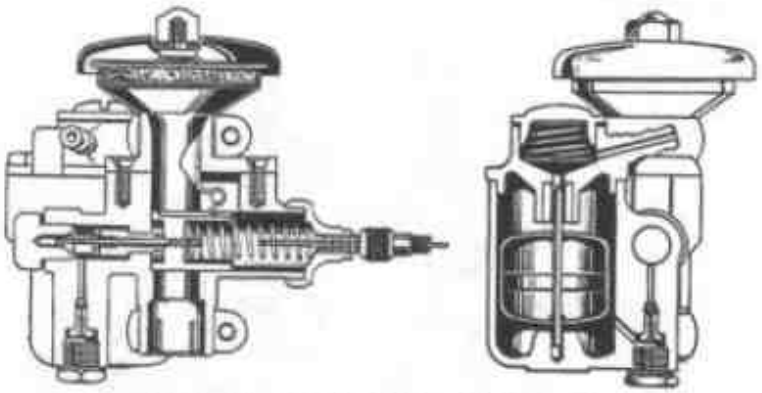

Fig. W13. Sectional View of Carburetter

When starting from cold, a catch on the handlebar control is lifted, which enables the throttle slide to be moved beyond its normal fully open position. The end of a groove in the slide catches a small tongue on the strangler which then pivots and partially closes the air intake. By this means a suitably rich mixture is provided which allows for prompt starting under all conditions.

Dismantling

Dismantling of the carburetter presents no difficulties and the components to be removed are shown in Fig. W12. In order to remove the needle from the throttle slide it is first necessary to remove the throttle cable as the needle circlip is held in position by the throttle slide return spring.

When replacing the throttle slide, the strangler must be pushed to its fully closed position so that the operating tongue on the strangler does not prevent the entry of the slide.

Tuning

The needle jet controls the mixture from idling to nearly full throttle and the main jet controls the mixture at large throttle openings although the throttle ranges influenced by each jet overlap to a certain extent.

Weak Mixture

Spitting back through the carburetter and overheating are indications that the carburetter is providing a weak mixture. The main jet and needle jet should be removed to check that they are not blocked and the various joints examined to ensure that there are no air leaks.

If these points appear to be in order, the mixture can be richened by raising the needle by one notch. If the mixture weakness is only apparent when the throttle is fully open, then a slightly larger main jet should be fitted.

Rich Mixture

Four stroking, heavy petrol consumption, and heavy deposits of soft carbon in the cylinder head and silencer system are signs of an over rich mixture. If the signs are only apparent when the throttle is fully open then a smaller main jet should be fitted, but otherwise the needle should be lowered by one notch.

Throttle Cable Adjuster

A throttle cable screwed adjuster is provided on the top of the carburetter and this should be regulated so that the strangler does not start to close until the catch on the handlebar control is lifted.

General Maintenance

The only regular maintenance required is to the two filters. The float chamber filter should be removed at regular intervals, say every thousand miles, and thoroughly cleaned in petrol. After very considerable mileages a small amount of foreign matter may accumulate in the bottom of the float chamber and this should be cleaned out with a piece of dry rag.

The air filter should also be removed at approximately one thousand mile intervals, thoroughly washed in petrol and allowed to dry, then soaked in a light engine oil for a few minutes and refitted after the surplus oil has drained off.

FAULT FINDING

Weakness

The symptoms are :—

Spitting back through the carburetter
Erratic slow running
Poor acceleration
Overheating
Sparking plug a dry grey colour around the points

If petrol starvation is suspected the fuel supply should be checked point by point. There is a filter attached to the petroil tap in the tank and if there appears to be a blockage in the main supply this point should be examined first. Secondly, examine the filter in the top of the float chamber. If these points appear to be in order, remove the main and needle jets and blow them through. Do not use a piece of wire to clean the jets out as this may damage the fine bore.

A worn throttle slide will allow excess air to pass into the mixing chamber and weaken the mixture. Air leaks between the carburetter and the cylinder will also provide a weak mixture and therefore the stub fitting should be carefully examined to ensure that it is providing an air tight joint with the cylinder and with the carburetter body. Small particles of grit present when the joints are made will prevent an effective air seal.

Richness

The symptoms are :—

Black sooty exhaust smoke
Four stroking
Heavy petrol consumption
Sparking plug sooty
Heavy lumpy running

Examine the air filter to ensure that it is not clogged and clean it if necessary. The needle jet or needle may be worn or one of the jets may be loose. A punctured float or a damaged float needle may cause persistent flooding and consequently a rich mixture.

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BSA SERVICE SHEET No. W108

November, 1953

MODEL W1 WINGED WHEEL

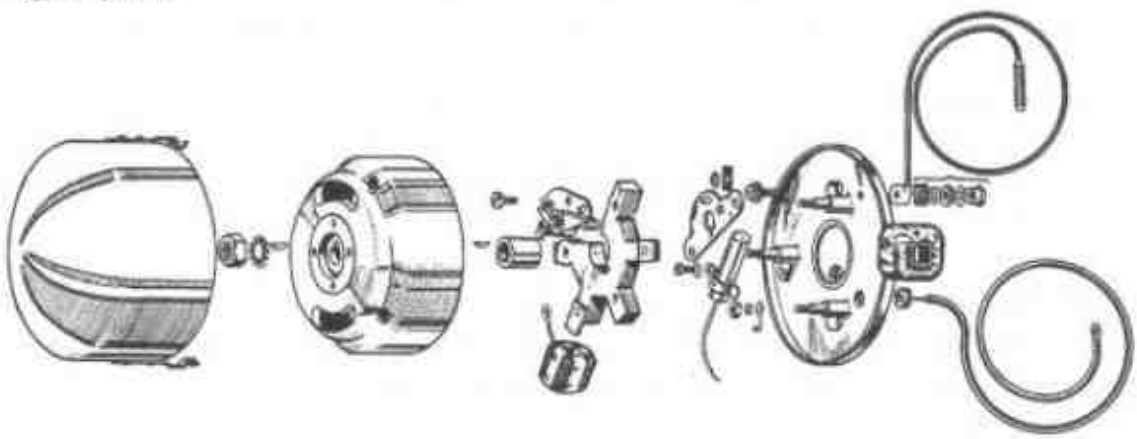
FLYWHEEL MAGNETO GENERATOR

The Wipac Series 90 Migemag Ignition Generator which is fitted to the Model W1 embodies two assemblies, namely the Flywheel and the Stator which carries the ignition coil, lighting coil, contact breaker unit and condenser. The cam is fitted on to the crankshaft, located by a key and held in position by the flywheel.

The ignition unit provides a high performance spark output over a very wide range of speeds, special attention having been paid to the needs of the motorised bicycle. An excellent spark performance of about 9,000 volts at only 350 r.p.m. rising to 12,000 volts at 6,000 r.p.m. is obtained, and it has been found possible to maintain a large enough air gap between rotor and stator, to ensure a trouble-free system.

A characteristic of the magneto is that its spark output will not vary over a wide timing range, thus rendering frequent adjustment of the contacts unnecessary, and at the same time allowing a fair tolerance for the accuracy of the setting. A further feature of the magneto is the accessibility and ease of adjustment of the contact breaker and other parts without the necessity of removing the flywheel at any time.

The lighting coil is energised by the three magnetic units which concentrate a powerful magnetic charge within a small space and volume, the characteristic being such that a brilliant light is obtained without flickering at a low speed, while the rise of output above the rated wattage is sufficiently low as not to allow the lamps to be seriously overloaded at maximum engine speeds.



Specification

Ignition — Direct. 12,000 V. at 6,000 r.p.m.
Contact Breaker Point Setting : .018 in.
Lighting — 6 Volts A.C., 7.8 Watts at 2,800 r.p.m.

Running Maintenance

Check and if necessary re-adjust the contacts once every 5,000 miles. (*See* Service Sheet W103.)

Occasionally clean the contacts by inserting a dry smooth piece of paper between them and withdrawing while the contacts are in the closed position. Do not allow the engine to run with oil or petrol on the contacts or they will start to burn and blacken, and if they do, lightly polish with a piece of smooth emery cloth.

After every 5,000 miles it is necessary to re-grease the cam lubricating pad. This is done by removing the pad and squeezing and working into it a Summer grade of motor transmission grease which will very closely resemble that used at the factory. Do not use ordinary grease.

If the magneto requires any attention beyond the replacement of contacts points and condenser, it is recommended that the complete machine should be sent to an authorised WIPAC service station. The following information is given for the benefit of those unable to do so :—

Checking the Magneto for Spark

If the engine fails to start and there is an indication of the magneto causing trouble, the spark can be checked by holding the H.T. lead $\frac{3}{16}$ in. away from an unpainted point on the unit. When the engine is rotated in the usual way, a spark should jump this gap. If no spark is visible, see that the H.T. lead is in good condition and examine the contact breaker. Make sure there are no metallic particles inside the housing, that the contacts are perfectly clean, and that the gap is correct to the recommended setting. If the contacts are found to be in a burnt or badly pitted condition, a faulty condenser is indicated. If the contact breaker appears to be in order the stator plate may be removed from the engine complete with coils, and the leads of the ignition coil should be examined to ensure that there is no break in the wiring. One lead is joined to a tab which is clamped underneath one of the nuts that anchor the stator to the stator housing. If this is in order check the other end of the primary ignition coil which is connected to the contact breaker assembly. The condenser lead and the lead from the breaker arm are also joined to this point. If these three leads are connected and the tabs are not earthing on the stator plate, the ignition coil should be in working order. In the unlikely event of the H.T. insulation of the secondary coil breaking down, it should be possible to detect signs of charring on the binding tape of the coil.

The Flywheel

The robust construction of the flywheel reduces the possibility of any faults on this unit to a minimum. The three powerful magnet inserts are cast in the rim of the wheel and it is not possible to demagnetise them by ordinary usage. No keepers are necessary when the magneto housing and stator are removed. The boss of the flywheel is located on the crankshaft by a keyed taper and locked by a nut and shakeproof washer. The flywheel may be removed with the aid of Service Tool 61-1735 or any other similar two jaw extractor. When replacing, the flywheel must be perfectly clean inside and out.

Adjustment of Breaker Points

The only adjustable part of the magneto is the breaker plate which provides for the setting of the breaker points.

To set these points proceed as follows :—

Turn the engine over until the breaker points are fully open and insert the feeler gauge. Slacken off the two breaker plate locking screws and pivot the plate until the correct setting of .018 in. is obtained. Re-tighten the locking screws.

The breaker point setting should only be adjusted in the manner described and at no time should the fixed contact be bent to provide adjustment. *See* Service Sheet W103.

Replacement of Breaker Points

The breaker points are supplied as an assembly consisting of the fixed and moveable points and breaker plate. Unsolder the leads from the coil and condenser, remove the two breaker plate securing nuts. The complete assembly can then be removed from the stator.

Removal of Condenser

Unsolder the lead from the condenser to the contact breaker assembly. Remove condenser clamp screw situated below the lighting coil and slide the condenser from under the condenser clamp which is rivetted to the stator plate.

The Lighting Coil

In the unlikely event of any fault developing with this coil, the removal and replacement is a simple operation and may be performed without disturbing the core assembly or ignition coil. To remove the lighting coil take out the terminal from the stator plate. Straighten with a pair of pliers the outer lamination of the coil core, which is bent outwards to hold the coil in position, and slide off the coil.

Replace in the same way as the H.T. coil.

Replacement of Ignition Coil

Before removing the coil it will be necessary to remove the breaker assembly and core assembly. The latter is effected by unscrewing the three clamp nuts. The core assembly may then be gently eased off the three stator plate studs. Care must be taken not to jerk it, otherwise the lead which connects the lighting coils to the terminal on the stator may be broken. In order to slide the coil from the iron limb, it is necessary to straighten the small brass tab found on the side of the coil facing the stator housing. If the coil is grasped firmly in one hand with the fingers under the coil and on either side of the core, it may be quite easily pulled off. To refit the ignition coil proceed as follows :—

Hold the coil in the left hand with the brass contact pointing away from the line of vision and the lead wires projecting downwards from the underside. With the other hand, push the coil core through the coil making sure that the brass locking tab rivetted to the iron is on the same side as the coil contact. Drive the fibre wedge provided in between the core and the coil on the same side as the locking tab and bend over the tab.

Important : Bend all stray loops of wire to within the radius of the stator and push down the condenser wire into the well of the stator housing to ensure that they do not foul the rim of the flywheel.

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November, 1953

MODEL W1 WINGED WHEEL

USEFUL DATA

Cylinder bore	36 m.m.
Engine stroke	34 m.m.
Engine capacity	35 c.c.
Standard compression ratio ...	8 to 1.
Piston ring gap	Max. .010 in. Min. .006 in.
Contact breaker gap	.018 in.
Ignition setting	5/32 in. before top dead centre.
Sparking plug type	Champion N7.
Plug gap	.015 in. to .018 in (.38 m.m. to .45 m.m.)
Carburetter type	Amal 335/1.
Carburetter main jet	30.
Carburetter needle jet	.0745 in.
Carburetter choke size	.39 in.
Carburetter throttle valve	3.
Carburetter needle position. ...	3.
Petroil tank capacity	½ gall.
Petroil mixture	25 to 1 (half gallon of petrol and two measures of oil).
Gearcase capacity	⅓ pint (1½ measures).
Gear ratio	18.7 to 1.
Hub driven gear	82 teeth.
Clutch shaft gear	17 teeth.
Clutch driven gear	66 teeth.
Engine shaft gear	17 teeth.
Brake diameter	9.7/32 in.
Brake lining width	⅜ in.
Wheel rim	Dunlop (B.S.A. 034) F9.
Standard tyre size	26 x 1½. Dunlop Carrier.
Standard tyre pressure	Lbs./sq. in. 40 43 46 49 52 55
	Rider's weight (stones) 7 8 9 10 11 12
Dry weight	26¾ lbs.
Generator output	7.8W.
Headlamp bulb	6V. 6W.
Tail lamp bulb	6V. .3A.

TECHNICAL DATA

Cylinder bore	1.4175/1.4165 in. dia.
Con. rod little end bore	.3753/.375 in. dia.
Gudgeon pin diameter	.375/.3747 in. dia.
Flywheel mainshaft diameter ...	.6292/.6290 in. dia.
Mainshaft bearing outer diameter	1.0237/1.0233 in. dia.
Mainshaft bearing rollers ...	.1968 in. dia. nominal
Hub centre balls	¼ in. dia.
Clutch shaft bearings, outer diameter	1.3122/1.3117 in. dia.
Clutch shaft diameter	.5002/.4997 in. dia.
Clutch shaft bearing type	Hoffmann L.S.5.

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BSA SERVICE SHEET No. W109

July, 1956

MODEL W1 WINGED WHEEL

USEFUL DATA

Cylinder bore	36 m.m.
Engine stroke	34 m.m.
Engine capacity	35 c.c.
Standard compression ratio	8 to 1.
Piston ring gap	Max. .010 in. Min. .006 in.
Contact breaker gap	.018 in.
Ignition setting	5/32 in. before top dead centre.
Sparking plug type	Champion N7.
Plug gap	.020 in. to .022 in. (.508 m.m. to .558 m.m.)
Carburetter type	Amal 335/1.
Carburetter main jet	27.
Carburetter needle jet	.0745 in.
Carburetter choke size	.39 in.
Carburetter throttle valve	3.
Carburetter needle position	3.
Petroil tank capacity	½ gall.
Petroil mixture	1 part of oil to 20 parts of petrol
Gearcase capacity	¼ pint (1½ measures).
Gear ratio	18.7 to 1.
Hub driven gear	82 teeth.
Clutch shaft gear	17 teeth.
Clutch driven gear	66 teeth.
Engine shaft gear	17 teeth.
Brake diameter	3.7/32 in.
Brake lining width	⅝ in.
Wheel rim	Dunlop (B.S.A. 634) F9.
Standard tyre size	26 x 1½. Dunlop Carrier.
Standard tyre pressure	Lbs. sq. in. 40 13 16 19 52 55
	Rider's weight (stones) 7 8 9 10 11 12
Dry weight	26¾ lbs.
Generator output	7.8W.
Headlamp bulb	6V. 6W.
Tail lamp bulb	6V. 3A.

TECHNICAL DATA

Cylinder bore	1.4175/1.4165 in. dia.
Con. rod little end bore	.3753/.375 in. dia.
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Clutch shaft diameter	.5002/.4997 in. dia.
Clutch shaft bearing type	Hoffmann L.S.5.

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