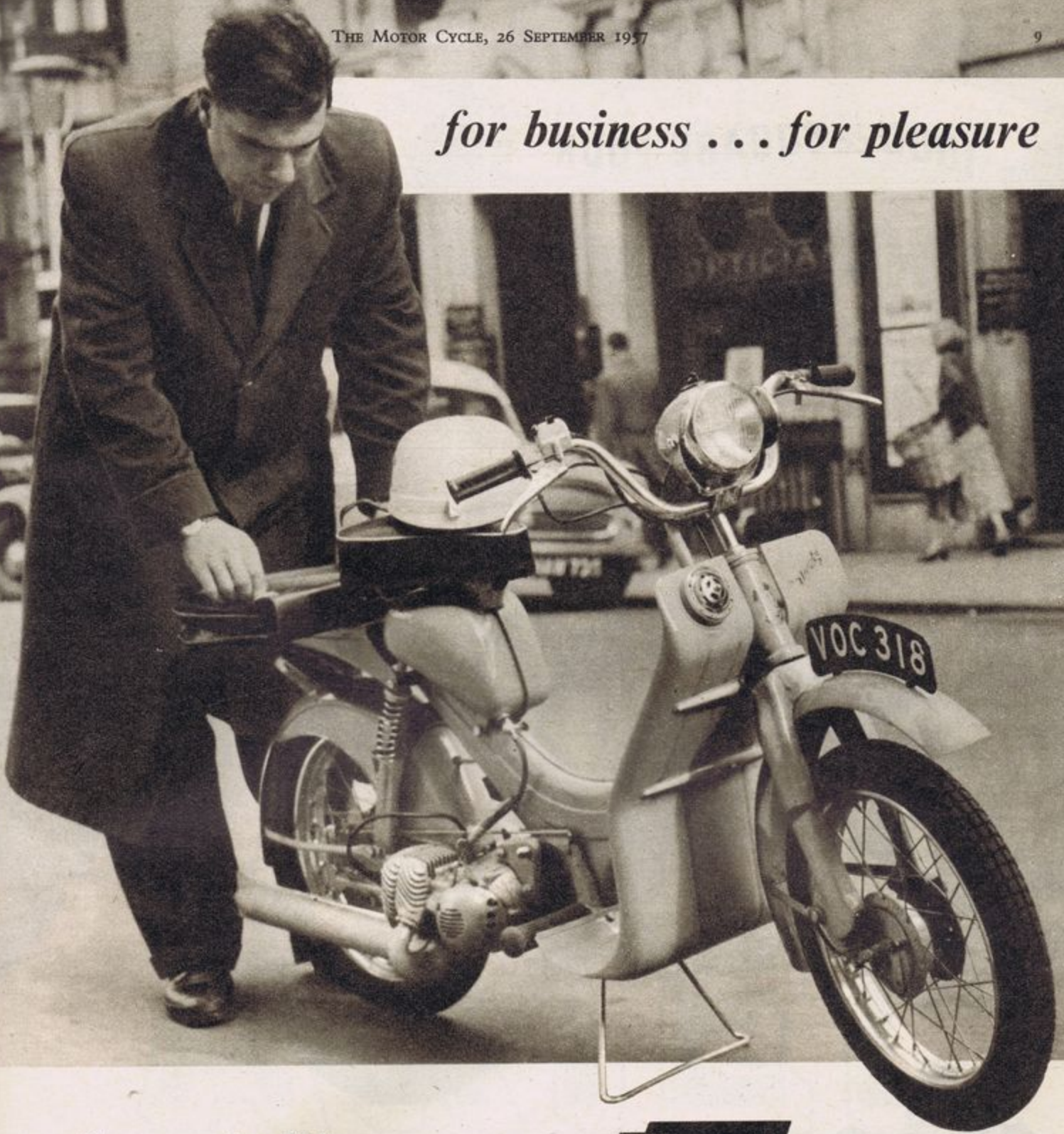


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Dandy 70

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SERVICE SHEET

NO.33.

DANDY '70' WITH LUCAS EQUIPMENT. CIRCUITS AND FAULT FINDING.

GENERAL DESCRIPTION.

The wiring circuits used with the Lucas 6F1 Generator differ from conventional systems in that the full output current is always flowing. This current is passed to earth i.e. the frame of the machine, through the lighting switch and horn-push contacts which are normally closed.

Operation of either of these switches opens the contacts thereby breaking the direct path to earth. Current is then diverted through the bulb filaments or horn windings as the case may be, before reaching earth on the frame.

The return from earth to the generator is made through the contact breaker points, short-circuiting the ignition coil. When the cam on the engine shaft opens the points, the current takes an alternative path through the coil and the sudden surge causes a spark to occur at the sparking plug.

Head and tail-lamp bulbs are wired in parallel between the switch and earth. When the lights are switched on, the current which is passing through the coil is also passed through the bulbs.

DATA.

Contact Breaker Points Gap Setting .014" - .016".

Ignition Timing $5/32$ " before T.D.C.

Headlamp Bulb. Lucas No. 386 6V. 15/15 watts. S.B.C.

Parking Bulb. Lucas No. 974 3.5V .015amp. M.E.S.

Tail-lamp Bulb. Lucas No. 990 6V. 3 watts. M.E.S.

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CIRCUITS.

The headlamp switch has three positions; "OFF" in the centre, "HEAD" to the right, and "PARK" to the left. The circuits in the various positions are described below.

Switch to "OFF" - Ignition only.

Current flows from the generator, through the horn-push, to switch terminal 7. It is then earthed by a toggle arm connected to the headlamp shell and returns to the generator via the contact-breaker points (or coil).

Switch to "HEAD" - Ignition and Lights.

Circuit as above up to terminal 7 but, since the toggle arm is now lifted, current passes through the dipswitch and headlamp bulb to earth by a lead from the bulb-holder to the headlamp shell. Thence through the frame and contact-breaker back to the generator.

The tail-lamp is fed from terminal 5, through internal switch connections to terminals 2 and 3, which are joined by wire links to terminal 7.

Switch to "PARK" - Parking Lights.

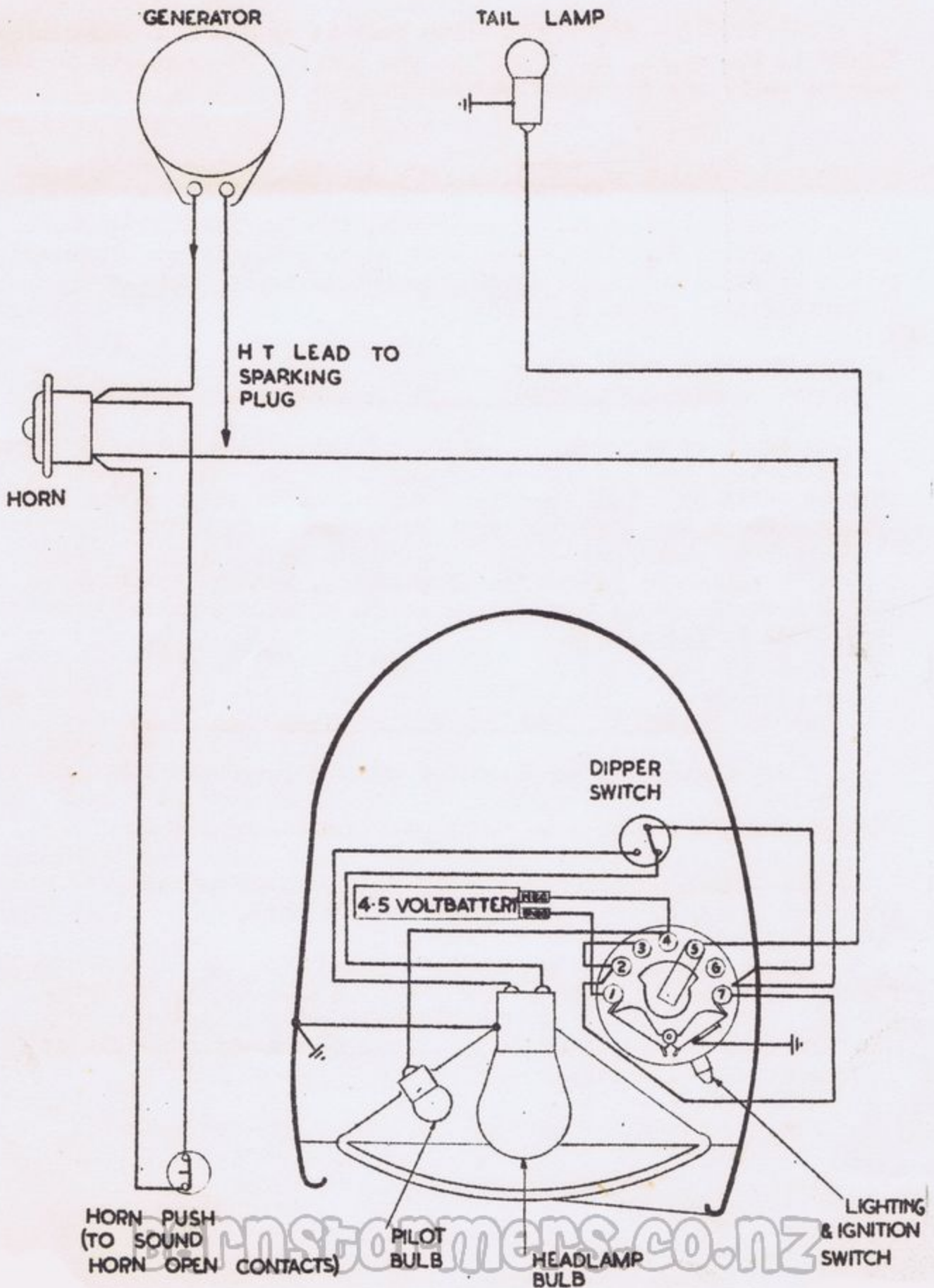
A dry battery is provided for parking purposes: the negative side being connected to terminal 4, from which current passes through the parking bulb to earth on the headlamp shell.

Terminal 5 supplies the tail-lamp; current is obtained from terminal 4 by internal switch connections.

Return from earth is made by a second toggle arm contacting terminal 1 which is wired to the positive side of the battery.

Current for ignition is available by the same circuit as in switch "OFF" position.

"DANDY 70" WIRING DIAGRAM (LUCAS)



TESTING.

Switch to "OFF" - Engine will not start.

Assuming that petrol is reaching the carburetter, the sparking plug is not fouled or faulty, and no H.T. current is present in the plug lead: proceed to test as follows.

Note. A point to watch while testing is that repeated attempts to start have not caused plug to oil up.

TEST 1.

Remove toolbox cover and locate the two wires inside frame. One is the tail-lamp wire which emerges in a plastic sleeve from the rear of frame. It can be identified by pulling gently on each wire in turn.

The other wire is the generator output lead and this should be uncoupled from the snap-connector. Earth the end leading from the generator by means of a test lead, one end of which is clipped to the engine unit.

(a). Engine still fails to start - generator assembly faulty. Examine or replace. This entails removal of the engine as described in Service Sheet No. 903.

(b). Engine starts - generator in order, proceed to test remainder of circuit.

TEST 2.

Rejoin snap-connector and detach horn. Bridge the two terminals and earth with test lead.

(a). Engine fails to start - wire between snap-connector and horn broken and must be replaced.

(b). Engine starts - replace horn and continue to test 3.

TEST 3.

Remove front of headlamp and connect test lead to terminal 7 and earth.

(a). Engine fails to start - replace wire between horn and terminal 7.

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Notes. It is just possible that there is an open-circuit in the horn windings and the horn-push or wiring simultaneously.

Open-circuit in horn only - engine will run, but horn will not sound, Pressing the push will cause engine to falter or stop.

Open-circuit in horn push or wiring - horn will sound when engine is turned over and starting may be difficult.

(b). Engine starts - look for poor or broken earth connection at the following points: moving test lead progressively along circuit.

Between terminal 7 and toggle arm.

Between toggle arm and headlamp shell.

Between headlamp shell and handlebars.

Between handlebars and frame.

Between frame and engine unit.

Switch to "HEAD" - Engine fails to start, but will do so in "OFF" position.

Circuit must be in order up to terminal 7, and from headlamp shell back to generator. Test the following connections:-

1. Between terminal 7 and dipswitch.
2. Dipswitch itself (both positions).
3. Between dipswitch and bulb (both wires).
4. Headlamp bulb (both filaments).
5. Between bulb-holder and headlamp shell.

Notes. Should a headlamp filament break, the tail-lamp will burn out almost immediately and the engine will stop. Operating the dipswitch to bring in the other filament, or switching to "PARK" or "OFF" will enable the engine to start again.

An earth anywhere between generator and terminal 7 will not effect ignition, but head and tail-lamps will not light.

Should toggle arm earth lead become disconnected, headlamp will light in all switch positions.

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JUNE, 1958.

SERVICE SHEET

No. 50X.

DAWDY 70. MAIN BEARING LUBRICATION.

Dandy Scooters fitted with engines numbered from DSE 13001/W have an improved method of main bearing lubrication. The bearing housing is packed with grease on assembly and a nipple is provided to facilitate replenishment.

To maintain correct lubrication, check monthly or at 500 mile intervals that the housing is completely filled by removing the screwed plug in the top of the crankcase and applying a grease gun to the adjacent nipple until grease emerges from the hole. Replace the plug.

Use one of the following greases for this purpose.

Mobilgrease MP.
BP Energrease L2.
Esso Multipurpose Grease H.
Castrolase LM.
Shell Retinax A.

Oil must still be added to the petrol in the proportions stated in the instruction booklet.

Assembly.

If a modified engine is dismantled for any reason it should be rebuilt as follows.

Press the smaller of the main bearings and the oil seal into the crankcase as described in Service Sheet No.903.

Take the larger bearing and grease the side opposite to that on which the type markings are stamped. Locate the sealing shim on the greased side ensuring that the raised centre is towards the bearing and seating between the inner and outer races. Assemble on the crankshaft with the shim between the bearing and the flywheel. Fit the distance piece to the crankshaft with the taper away from the flywheel as shown on Fig.1.

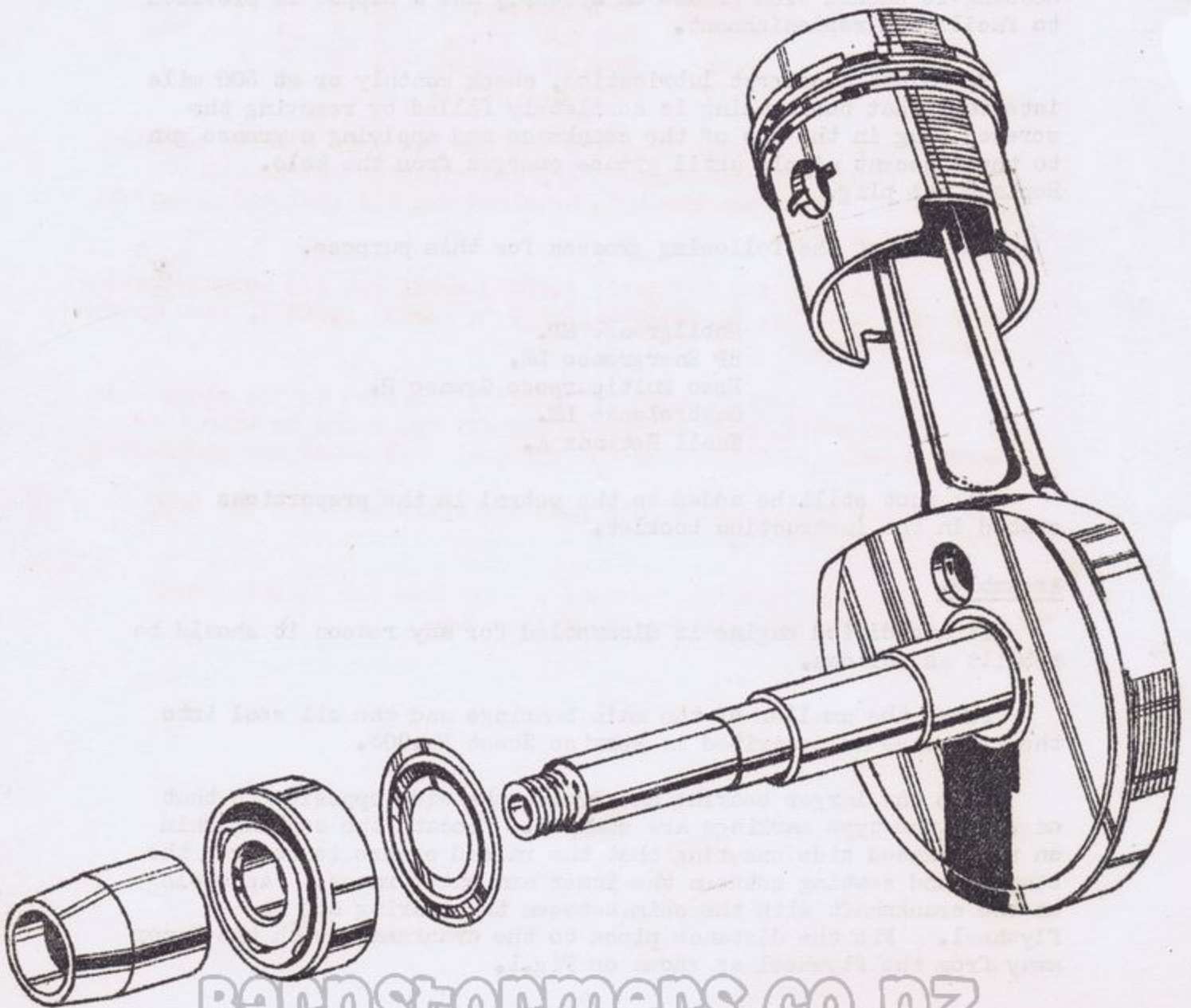
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Continued.....

B.S.A. Service Sheet No.50 continued...

Now press the crankshaft and bearing into the case and continue assembly. It is important to avoid disturbing the location of the shaft during fitting of the generator as the shim may be damaged.

Fill the grease chamber as described above.



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FIG.1.

Earlier machines can be modified if necessary, but the following instructions must be closely adhered to.

MODIFICATION.

The following new parts will be required.

64-94	Grease tube.	2 per set.
64-95	Nipple.	1 " "
21-6204	Bolt.	1 " "
67-1709	Bolt washer.	1 " "
64-93	Air hole plug.	1 " "
64-91	Sealing washer.	1 " "
64-96	Distance piece.	1 " "

Remove the engine from the machine and take off the cylinder barrel, right hand crankcase half, and withdraw the crankshaft assembly. Take out the main bearings and oil seal and clean all parts thoroughly.

Using a Letter "B" drill (.238") drill two (2) holes as shown in Fig. 2 and Fig. 3, using a Letter "C" drill (.242"), open up the 2 outer holes.

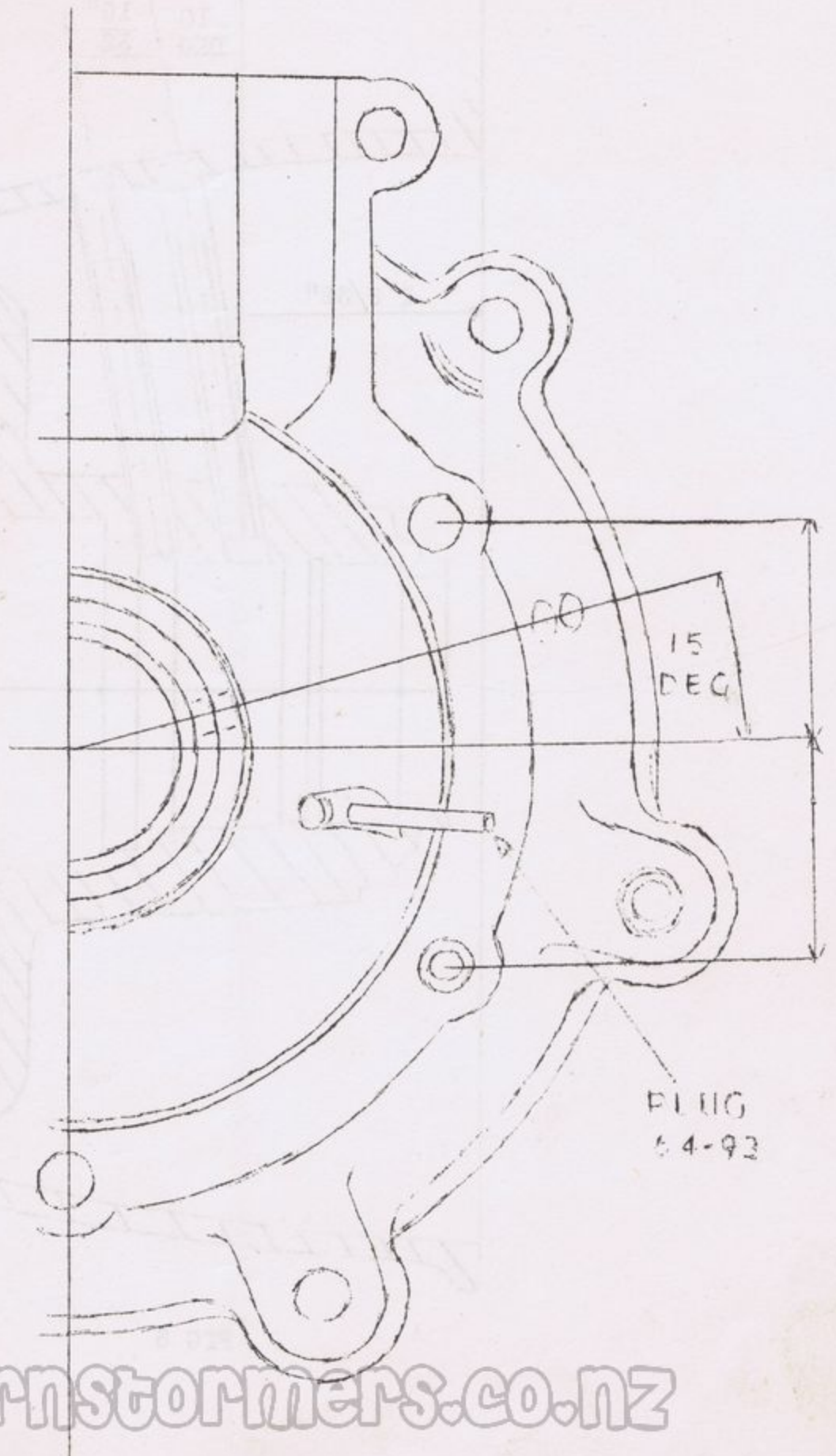
Apply a light coating of jointing compound to the plain ends of the two tubes, Part No.64-94, and fit the tubes so that the screwed ends are flush with the external surface of the crankcase.

Screw the grease nipple into the outer tube and the bolt into the other tube.

Plug the existing internal oilway from the flywheel side with Part No.64-93 and pean over securely.

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Fig. 2.



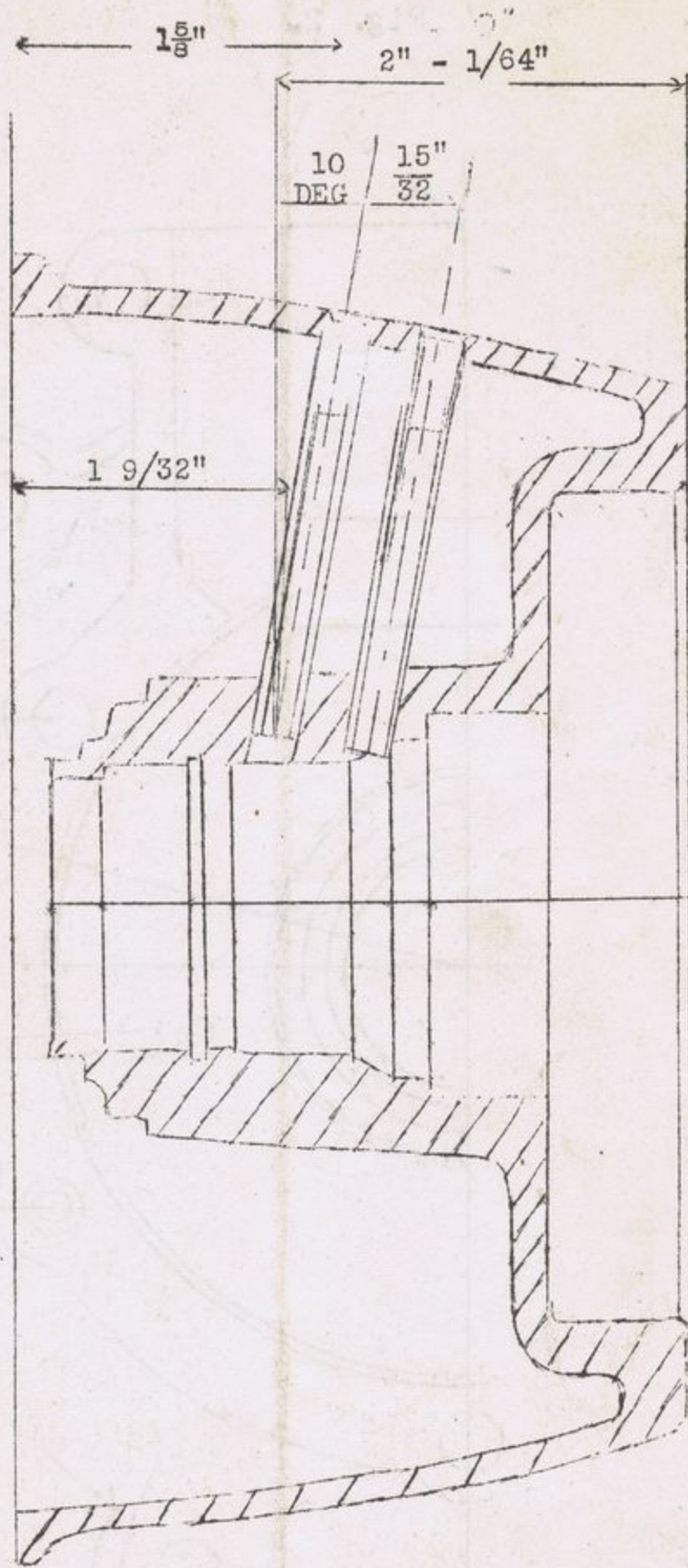


FIG 3



April 1958

SERVICE SHEET

No. 51.

DANDY 70.

KICKSTART.

Dandy Scooters after Engine No. DSE.13301W. are fitted with a new kickstart assembly, the quadrant of which is in constant mesh with the ratchet pinion.

The new parts can be fitted to earlier machines and a conversion set Part No. 64-3134 is now available. The old parts can no longer be supplied. Individual Part Numbers are detailed below:-

<u>PART NUMBER.</u>	<u>DESCRIPTION.</u>	<u>PRICE.</u>
64 - 3039	Circlip	1d.
64 - 3125	Washer	1d.
64 - 3121	Gear	£1. 3. 6d.
64 - 3123	Ratchet Pinion	8. 11d.
64 - 3127	Quadrant	£1. 1. 9d.
64 - 3130	Cover	£1. 11. 6d.
64 - 3132	Ratchet Spring	2d.
64 - 3133	Return Spring	1. 0d.
64 - 3064	Cap	2d.
64 - 3065	Seal	3d.

SERVICE SHEET NUMBER 51 CONTINUED.

FITTING.

Gear box covers will be supplied complete with quadrant and spring assembled.

Release the footstarter crank pinch bolt and take off the crank.

Unscrew the 5 cover screws, place a pan underneath to catch the oil and take off the cover complete with quadrant.

Take out the 53T gear complete with ratchet. Fit the replacement 53T gear on its shaft followed by the new ratchet. Note that although very similar in appearance to the new parts the old gear and pinion must not be used.

Place the ratchet spring in the cup on the inside of the cover, if the spring does not grip the cup open out the first coil slightly.

Place the footstarter crank over the spindle at approximately 1'0 clock and feed the cover over the 2 shafts and the gear shifter.

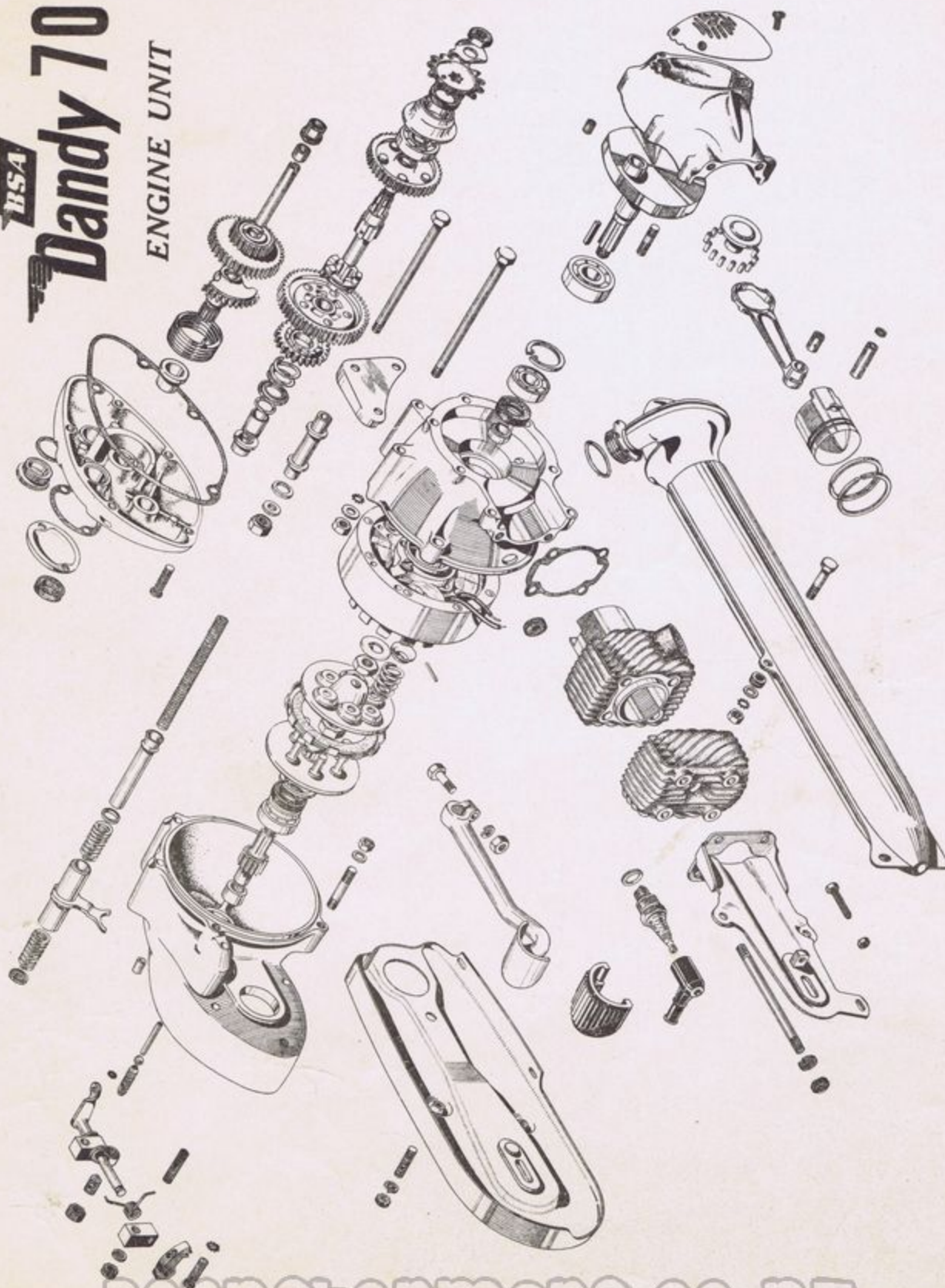
Now turn the quadrant by means of the footstarter crank applying light pressure on the cover until the quadrant and ratchet are in mesh.

Press the cover firmly home, replace the 5 screws and check the action, if correct fit the crank in the normal position and refill the gear box with oil.

Do not omit the felt oil seal and retainer between the cover and the crank.

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BSA
Dandy 70
ENGINE UNIT



The DANDY Engine and Gearbox (Exploded View)

Dandy 70

DECARBONISATION

To maintain the engine in an efficient condition, it is recommended that decarbonising should be carried out at intervals of approximately 1,500 miles. A two-stroke engine is particularly affected by the formation of carbon. The symptoms indicating an excessive deposit are rough and uneven running of the engine, a tendency to pink when under load, a falling off in power and four or eight stroking when running lightly loaded.

Not only the cylinder head and piston crown will require clearing of carbon, but also the exhaust port and silencing system.

To remove the cylinder head and barrel, first take off the right-hand wheel spindle nut "A," Fig. Z1, and partly withdraw the spindle towards the left-hand side. Unscrew the small nut and bolt "B," holding the silencer to the swinging arm plate, and release the silencer from the cylinder barrel by unscrewing the union nut "C," using the special spanner provided in the tool-kit.

Next remove the two bolts "D," which secure the swinging arm plate to the rear fork, noting the positions of the distance piece, the fork end stiffening plate, and the brake anchor strap. Unscrew the sparking plug and take off the four cylinder head nuts "E." The swinging arm plate and cylinder head can now be drawn away from the barrel. It is best to clear the carbon from the piston crown at this stage, taking care not to score the soft aluminium.

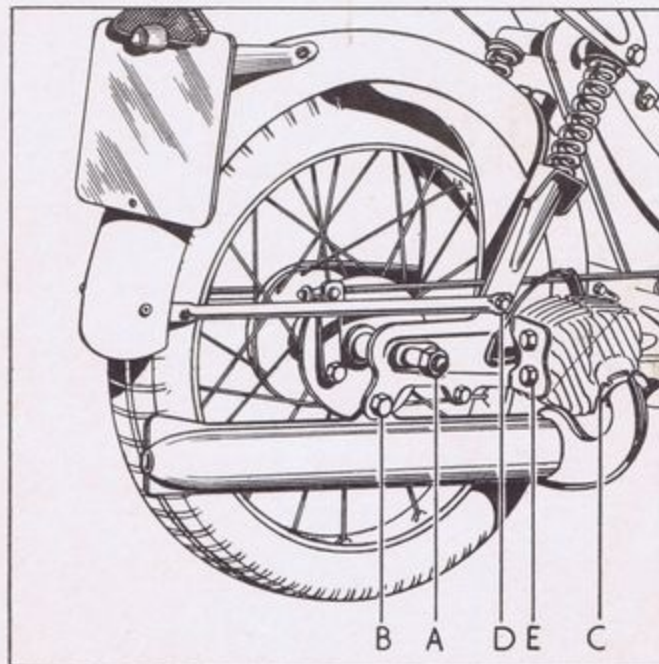


Fig. Z1. Removal of Cylinder Head and Barrel.

The cylinder barrel itself has a long spigot fitting into the crankcase, which has two studs at this point, one above and one below the spigot. The nuts on these studs must be slackened before the cylinder barrel can be withdrawn. As the piston emerges from the cylinder, it must be supported to avoid damage. Inspect the piston rings to see that they are quite free in their grooves. Clean out the various ports in the cylinder, but be careful not to remove any metal by over-enthusiastic scraping.

Wipe all traces of loose carbon from the piston and cylinder bore, apply a little clean oil and re-fit the cylinder, making sure that the piston rings are properly seated with their ends resting either side of the pegs in the grooves. A new cylinder base washer should be used.

Carefully scrape the carbon from the combustion space in the cylinder head, and replace the head on the barrel so that the finning matches up. Follow on with the remaining parts in the reverse order to that in which they were removed, not forgetting to tighten the two nuts at the base of the cylinder after the four cylinder head nuts have been tightened fully.

As the silencer is non-detachable, it must be soaked in a caustic soda solution, preferably overnight, and then thoroughly washed out in running water. On no account should the caustic solution be allowed to touch any of the aluminium or painted parts of the machine.

Dandy 70

REMOVAL OF ENGINE FROM FRAME, DISMANTLING AND RE-ASSEMBLING

Take off the carburetter cover plate "B," Fig. Z2, which is retained by three screws, and pull the carburetter away from the crankcase leaving the cable and petrol pipe attached. Tie the instrument up out of harms way.

Remove the right-hand wheel spindle nut and the two bolts holding the swinging arm blade to the rear fork (see Fig. Z1, Service Sheet No. 902). Partly withdraw the wheel spindle towards the left-hand side.

Disconnect the lead from the generator at the snap connector which will be found inside the frame behind the large rubber cover. Pull the lead clear of the frame.

Unscrew the six nuts "A," Fig. Z2. Take off the engine plate. The engine can now be drawn away complete with the silencer and the swinging arm blade.

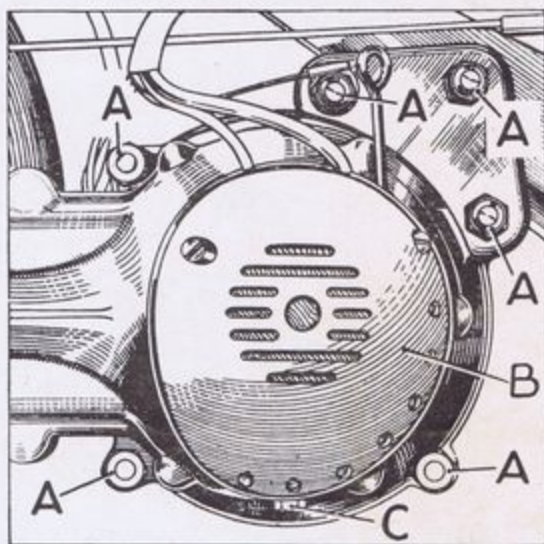


Fig. Z2. Removing Engine.

CONTACT POINTS—WICO GENERATOR

If the purpose in removing the engine is to clean or adjust the contact-breaker points "B," Fig. Z3, the flywheel must be drawn off. Bend back the locking washer and unscrew the nut, holding the flywheel by inserting Service Tool No. 61-3551 through the two holes in the sides of the clutch driving cup. A suitable tommy bar or long bolt placed in one of the crankcase lugs will prevent rotation.

The mainshaft is a parallel fit in the flywheel, which is keyed in position. To withdraw the flywheel use Service Tool No. 61-3540, or a pair of No. 61-3548 in conjunction with an Extractor No. 61-3256.

Turn the engine until the points are fully open and adjust the gap to .018"—.020" by slackening the fixing screw "D" and turning the eccentric adjusting screw "E." Re-tighten the fixing screw.

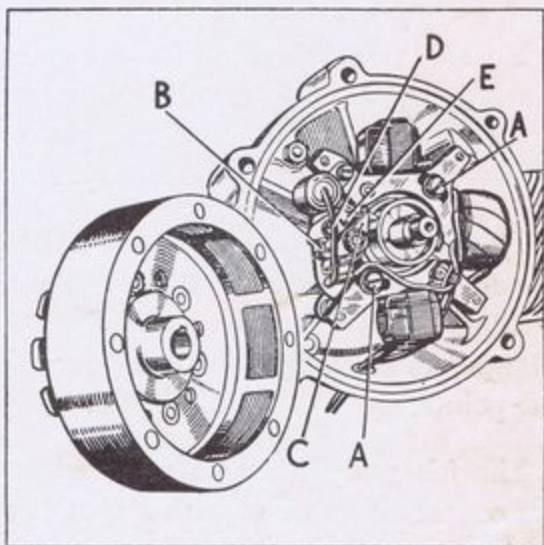


Fig. Z3. Generator (Wico)

To remove the points assembly; take out the fixing screw and detach the two wires which are secured by a small screw and nut. The points can be cleaned by lightly polishing with smooth emery cloth. Lubricate the felt pad by working into it a small quantity of motor transmission grease. Do not use ordinary grease.

CONTACT POINTS—LUCAS GENERATOR

Models having a Lucas generator can be identified by the letter "L" included in the engine number prefix.

In this case it is not necessary to withdraw the flywheel to check and adjust the points. An opening is provided in the face of the flywheel for this purpose.

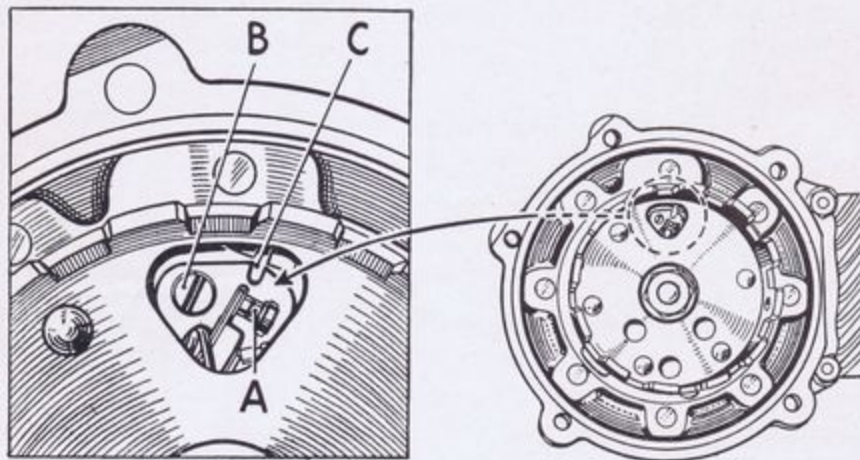


Fig. Z4. Adjusting the Contact Breaker Points (Lucas).

Rotate the flywheel until the opening is in line with the contact-breaker and the points are fully open. Slacken the fixing screw "B," Fig. Z4, place the end of the screwdriver in the slot "C" and move the plate as necessary to obtain the correct points gap of .014"—.016". Re-tighten the fixing screw.

To remove the points assembly, the flywheel must be drawn off as already described. Take out the fixing screw and remove the nut from the terminal post, noting the positions of the various washers. Carefully prise off the return spring and lift off the two wires. The points assembly can then be removed. Very fine emery cloth may be used to clean the points.

The felt pad should be removed or re-impregnated with clean engine oil. Lubricate the contact lever pivot with a spot of engine oil.

Note.—Before re-fitting the flywheel, make sure that no metallic particles have been attracted on to the magneto. Always use Service Tool No. 61-3536 to avoid placing any strain on the con-rod assembly. Fit a new locking washer under the nut.

TO CHECK IGNITION TIMING

Remove the sparking plug and turn the engine in an anti-clockwise direction (looking at the generator side) until the piston is at the top of its stroke. Then turn back until the piston has moved $\frac{5}{32}$ in. from T.D.C. In this position the cam on the mainshaft should be just commencing to lift the contact-breaker rocker arm "C," Fig. Z3 or "B," Fig. Z5, and the points should be not more than .002in. apart. If they are open more than this, the timing is too far advanced. If they are open less, the timing is retarded.

The cam itself is keyed to the mainshaft, but a small adjustment can be made to the timing by slackening the two screws "A," Figs. Z3 or Z5, and moving the stator assembly either way as necessary. After re-timing, tighten the screws firmly.

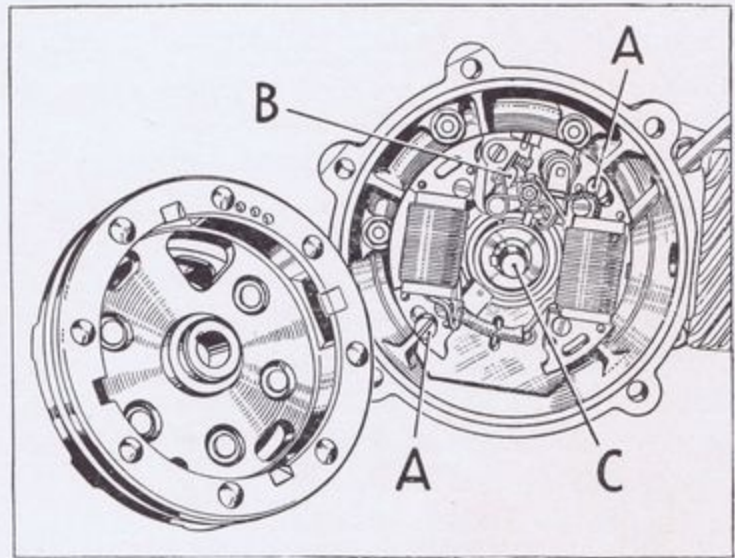


Fig. Z5. Generator (Lucas).

COMPLETE DISMANTLING OF THE ENGINE

Take out the two screws "A," Figs. Z3 or Z5, and withdraw the stator assembly, pulling the two leads through the rubber grommet in the housing. Prise off the contact-breaker cam and lever the key out of the shaft with a small screwdriver or similar tool.

Remove the swinging arm blade, cylinder head and cylinder barrel as described in Service Sheet No. 902. The gudgeon pin is secured in the piston by means of circlips. Take out one of these with a pair of thin-nosed pliers, warm the piston by applying a cloth soaked in hot water and press out the gudgeon pin. Support the piston firmly during this operation to avoid straining the con-rod.

Now unscrew the five crankcase stud nuts from inside the generator housing, and also the two nuts at the base of the cylinder. The outer crankcase half can then be drawn away. As the crankpin is of the overhung type, both main bearings are contained in the inner half of the crankcase. Press the mainshaft assembly out of these bearings. Note that the crankpin is not detachable; should it be necessary to renew the big-end bearing, a complete new mainshaft assembly must be used.

An oil seal is located behind the contact-breaker cam. This can be prised out of the housing after the small ring has been removed from its centre. Both main bearings must be extracted from the right-hand side of the housing by means of a suitable drift or puller. The smaller bearing is retained by a spring ring. Heat the crankcase in hot water before attempting to remove or replace the bearings.

RE-ASSEMBLING THE ENGINE

Re-assembly is carried out in the reverse order to dismantling; using a new oil seal on the engine mainshaft.

Inspect the piston and rings; discoloured patches on the outer surfaces of the rings indicate a leakage of gas from the combustion chamber and the rings should be renewed. The skirt of the piston should present a dull, even surface. High spots will show up as small bright patches, and these may be very slightly eased with a very fine file. Heavy scores denote a partial seizure, possibly caused by insufficient lubrication, a too weak fuel mixture or retarded ignition, any of which would result in overheating. Fit a new piston after the cause of the trouble has been investigated and cured. Check that the rings are a close fit in the grooves; there should be no noticeable side play. The ring gaps should be not more than .013in., or less than .009in. To measure the gaps accurately, place each ring squarely in the cylinder bore, preferably near the base where the least wear takes place.

The crown of the piston is marked "EXHAUST" on one side. This side must be next to the exhaust port in the cylinder; that is, on the right-hand side of the engine. Failure to observe this precaution may result in the ends of the rings becoming trapped in the cylinder ports.

Do not forget to adjust the contact points gap before replacing the flywheel on a Wigo generator.

A useful tool for turning up the locking washer on to the flywheel nut consists of a substantial flat bar which has the end bent at right-angles and ground to a wedge shape. Rest the wedge behind the washer and strike the flat of the bar with a hammer.

When the re-assembly is completed, replace the engine in the frame and securely tighten all nuts and screws. It will be noticed that the carburetter is a push fit into a plastic sleeve in the crankcase. Two rubber rings in grooves on the carburetter spigot provide a seal. These may require renewing occasionally to ensure an air-tight joint.

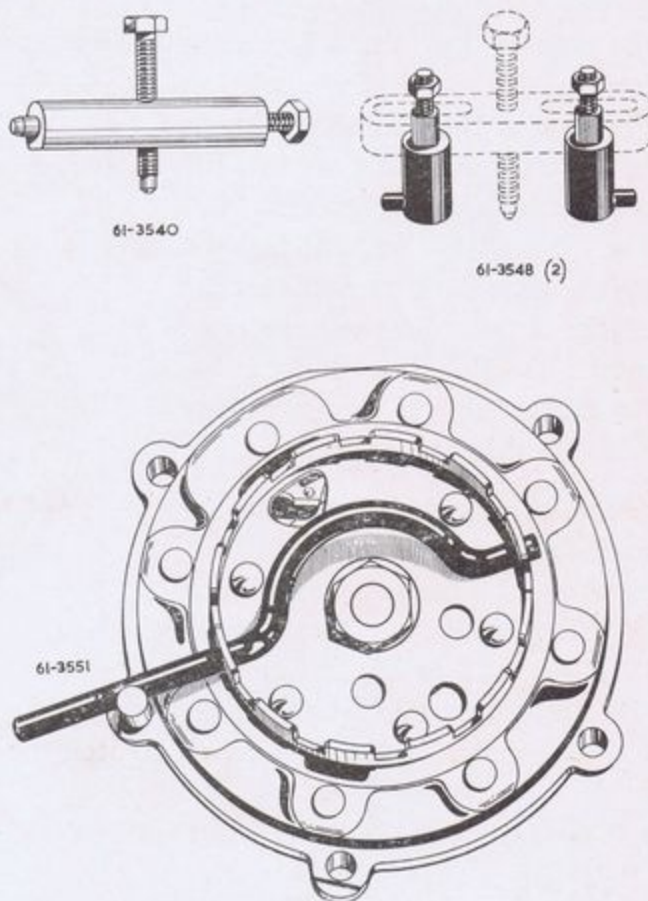


Fig. Z6. Flywheel Removal Tools.



Fig. Z7. Flywheel Assembly Tool.

Dandy 70

REMOVAL OF GEARBOX FROM FRAME, AND DISMANTLING

First, take out the rear wheel, as described in Service Sheet No. 906. Release the clutch and preselector cables from the handlebar controls. The clutch cable nipple is mounted in a slotted adaptor in the control lever, and can be slipped out once the outer cable is detached from the control body.

Pull off the plastic grip from the preselector control; if this proves to be a tight fit it can be eased by applying a cloth soaked in hot water. Screw in the adjuster at the rear of the gearbox until sufficient slack cable has been obtained to enable the retainer "A," Fig. Z8, to be removed from the end of the twistgrip. The cable adjuster is locked by means of a plate secured to an adjacent stud or, on early models, by a locknut.

Inside the handlebar will be found the cable stop positioning rod "B," which also serves to lock the guide screw "D." Unscrew the rod several turns and take out the guide screw. The cable stop "C" can then be pulled out by means of the rod, and the cable withdrawn from the handlebar. Before drawing the two cables down through the frame, tie a length of stout string to each so that it can be used to assist in threading the cables back again.

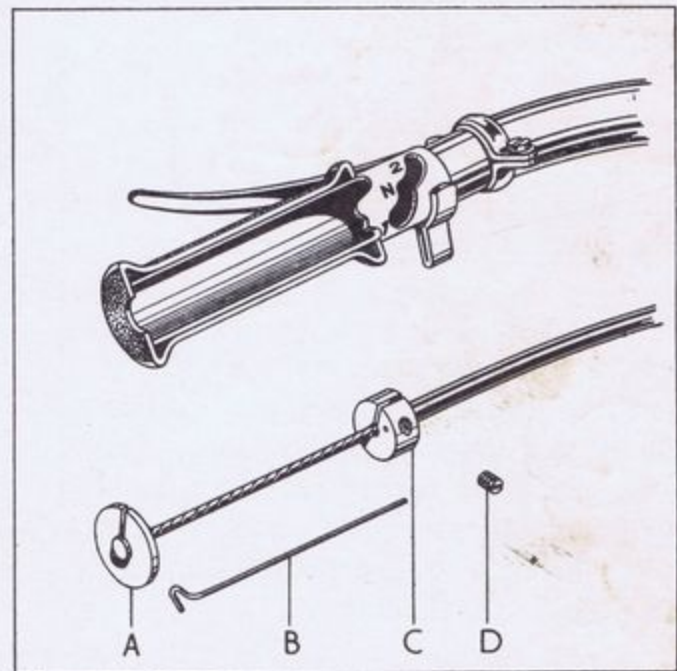


Fig. Z8. Preselector Control Assembly.

An alternative is to detach the cables from the gearbox end, and this is the best method if the intention is to dismantle the gearbox. To do this, the gearbox cover must be removed by unscrewing the five screws around the outer edge, not forgetting to place a tray underneath to catch the oil.

Select second gear and operate the clutch lever, then turn the control to the first gear position but do not touch the clutch lever again. Screw in the cable adjuster until the cable is slack enough to allow the anchor plate to be removed from the outer end of the gear shifter. The adjuster can then be completely unscrewed and the cable pulled out of the gearbox.

Next, the clutch adjuster should be screwed down, and the push-rod adjusting screw slackened right off; so that by lifting the withdrawal lever, the cable nipple may be disengaged. Note that, as soon as the clutch withdrawal lever is lifted, the gear shifter will spring outwards and may push the first gear pinion off its shaft if not held in place. If difficulty is experienced in disengaging the cable nipple due to lack of clearance behind the lever, the two nuts holding the locking arm spindle may be loosened a few turns and the whole assembly moved outwards a small amount. When the cable is free, unscrew the adjuster and take away the cable. Replace the gearbox cover temporarily to prevent the ingress of dirt and to keep the internal parts in place.

Remove the two bolts "A," Fig. Z9, from the rear fork end, and also the bolt "B," which passes through the chaincase into the mudguard valance. There are no loose distance pieces or nuts on the bolts, but there is a distance piece fixed to the mudguard valance, and the chain and chaincase must be guided clear of this as the gearbox is taken away. Unscrew the six nuts "A." (See Fig. Z2, Service Sheet No. 903.)

Pull out the three bolts, and replace them from the opposite side to support the engine. The gearbox complete with chaincase can now be removed.

Should it be desired to remove the engine and gearbox as a unit, carry out the operations described in this Sheet and those in Service Sheet No. 903. Only the two engine plate bolts "D" Fig. Z9 need to be taken out, the pivot bolt and engine plates being left in position on the frame.

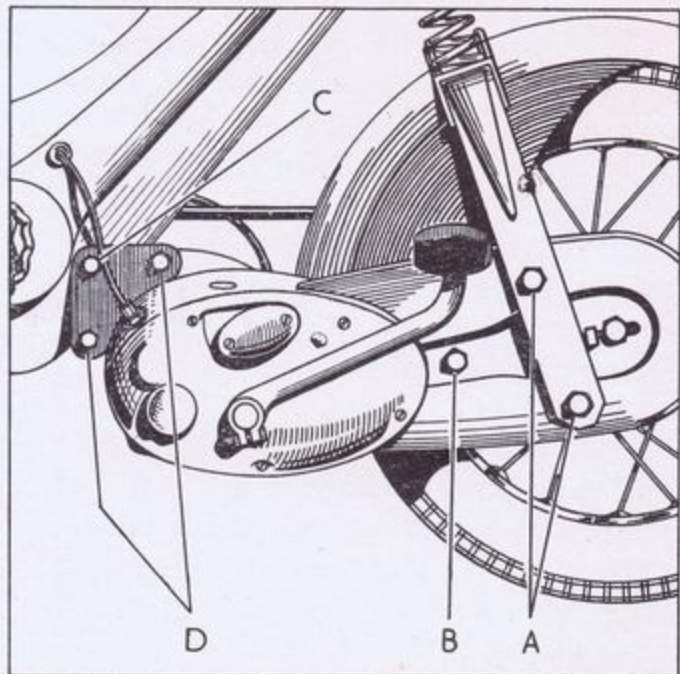


Fig. Z9 Removal of Gearbox.

DISMANTLING THE GEARBOX

Drain out the oil, if this has not already been done. Slacken the pinch bolt in the starting lever and pull the lever off the splines on the quadrant spindle. Remove the cover and withdraw the quadrant, first noting the location of the return spring. The bush may be pressed out towards the inside of the cover, after the felt oil seal and retaining collar have been prised out.

The first gear pinion and the ratchet pinion are held together by means of a spring, collar and circlip. They can be lifted off the output shaft as a unit and need not be separated unless one of the components is to be renewed. Next, the sliding dog and the gear shifter should be taken out, followed by the locking arm spindle assembly after removal of the two nuts.

The clutch is dismantled quite simply by compressing the springs by hand, one by one, and removing the cotter pins "B," Fig. Z10, the collars "A" and the springs. This releases the pressure plate and the driving plate, leaving the back plate secured by a central nut. Bend back the lock-washer and place Service Tool No. 61-3553 over the six pins in the back plate, with the holes in the arms located over two of the housing studs. Unscrew the nut and lift off the back plate.

It is not advisable to use an ordinary sprocket puller to remove the back plate, owing to the risk of distortion. If the plate is a tight fit on the splines, a sharp tap with a mallet on the end of the shaft will free it.

Behind the back plate will be seen the end of the gear cluster spindle, which is slotted and pinned to prevent rotation. Tap this spindle out, using a suitable drift, and remove the gear cluster.

Unscrew the sprocket securing nut after bending back the lock-washer, holding the sprocket with Service Tool No. 61-3554. Take off the sprocket and press the shaft through towards the inside of the gearbox. The second gear pinion can now be removed. The bearing and oil seal are housed in a steel sleeve in the gearbox casing. Prise out the oil seal and press out the bearing, again towards the inside of the gearbox.

Extract the clutch push rod from the input shaft. This is in two parts with a ball bearing between, the shorter portion having a rubber oil seal ring fitted in a groove. Remove the circlip from the clutch side of the housing and press the shaft out in that direction complete with the bearing, oil seal and oil seal ring. The needle roller bearing, which supports the other end of the shaft, can be pressed out either way.

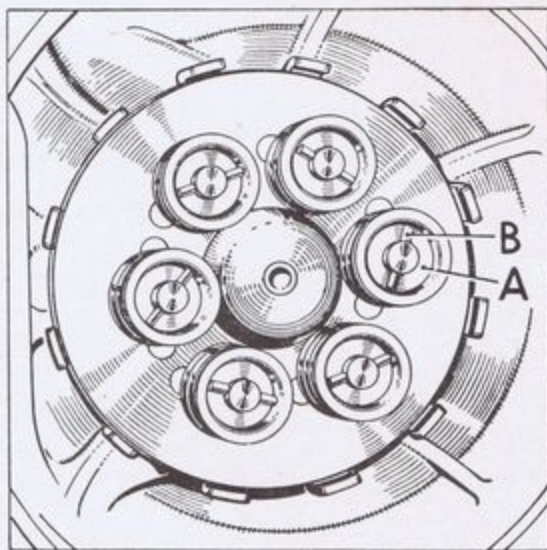


Fig. Z10. Clutch Springs.

BSA SERVICE SHEET No. 905

June 1957

Dandy 70

RE-ASSEMBLING THE GEARBOX

Fit the needle roller bearing into its housing and insert the input shaft, place the ballrace over the shaft and press into position. Follow on with the oil seal ring and oil seal, and replace the circlip, then replace the clutch backplate and secure it with the nut and lockwasher. Service Tool No. 61-3553 will hold the backplate while the nut is tightened.

Press the output shaft ballrace into the steel sleeve, pass the shaft through the second gear pinion and into the bearing, making sure that the side of the pinion with which the sliding dog engages is facing outwards.

Place the gear cluster into position, line up the slot in the end of the spindle with the pin in the housing and press it home. To guard against oil leakage, the end of the spindle should be coated with jointing compound.

Next, fit the oil seal, sprocket, lockwasher and nut to the output shaft. Tighten the nut while holding the sprocket with Service Tool No. 61-3554. Always use new lockwashers and turn them up securely against the nuts after tightening. New oil seals should also be fitted when re-assembling.

Complete the clutch assembly by fitting the driving and pressure plates, and the springs, collars and cotter pins. It is preferable to use new springs if the originals have already seen a period of service.

At this stage, the gearbox can be re-fitted to the machine, not forgetting to place the driving chain around the sprocket, with the closed end of the connecting link spring facing forward on the top run. Replace the bolts and nuts shown in Figs. Z2 and Z9, (see Service Sheets Nos. 903 and 904).

Assemble the gear shifter, noting the correct positions of the springs, shown in Fig. Z11. The cranked portion of the fork faces outwards, so that the projection with which the locking arm engages is to the front of the gearbox. Place the sliding dog in the shifter fork and fit the assembly into the gearbox. The sliding dog must engage the splines on the out-put shaft and the shifter tube enter into its housing. Pass the cable through and screw in the adjuster until the anchor plate can be replaced behind the nipple. To obtain the maximum amount of slack cable, the handlebar control should be in the first gear position and the gear shifter pushed right home so that the sliding dog engages second gear.

The shifter tube on early models was without the washer brazed to the inner end which serves to centralise the tube. To fit the modified part, it may, in some cases, be necessary to ream out the housing in the gearbox shell to its full depth, using a standard 13/16in. reamer. With the modified shifter tube, later type springs should also be fitted. These are longer than the originals and are identified by a yellow paint marking.

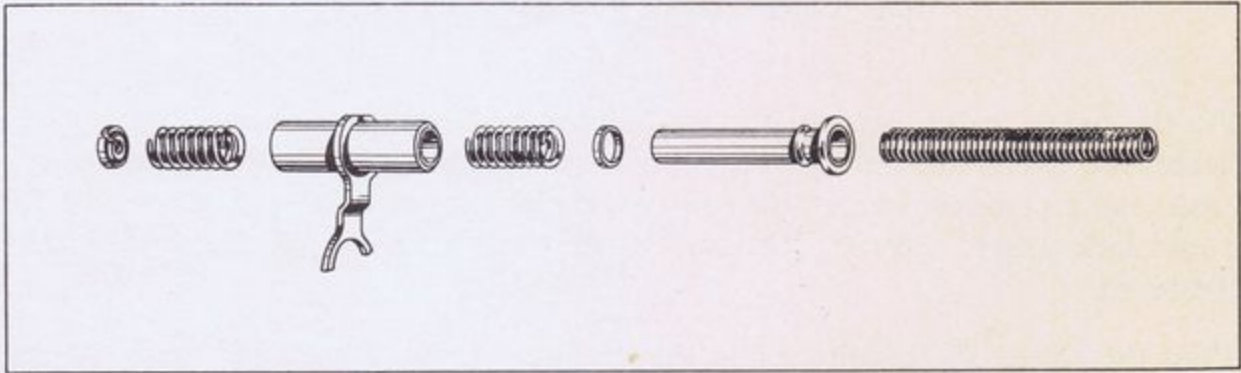


Fig. Z11. Gear Shifter Fork Assembly.

Lightly grease the long clutch pushrod and the ball bearing, and insert them into the hollow input shaft, followed by the short pushrod. The latter has an "O" ring in the middle groove to act as an oil seal; see that this is intact. Take the locking arm spindle assembly and connect the clutch cable to the withdrawal lever. At the same time, fit the two alloy bearing blocks over their studs and start the nuts. One end of the return spring should be located in a hole in the side of the clutch operating arm, while the other end bears on the underside of the top of the gearbox casing. Check that the pushrod adjusting screw is slackened off, and that the locking arm is not fouling the gear shifter. Tighten up the two nuts.

Make sure that the clutch withdrawal lever is at the bottom of its travel. If necessary, slacken the pinch screw "D," Fig. Z12, in the locking arm at the other end of the spindle to prevent the arm being held up by the gear shifter. Screw out the cable adjuster "C," until there is approximately $\frac{1}{8}$ in. free play in the cable. Turn the pushrod adjuster "B" in a clockwise direction until resistance is felt; then back off half a turn and tighten the locknut "A."

Replace the first gear assembly on the output shaft. Fit the starter quadrant and spring to the cover and re-fit the cover to the gearbox, using a new gasket and a smear of jointing compound to ensure an oil-tight joint. On early models there will sometimes be a shim inside the hollow quadrant spindle to limit the clearance at the end of the gear cluster spindle. The depth of the spigot hole in the quadrant must be approximately .010in. greater than the length of spindle protruding from the gear cluster. If the clearance at this point is too large, it is possible for the spindle to move outwards until an oil leak occurs past the slotted end.

B.S.A. Service Sheet No. 905—continued

Set the pre-selector control to neutral and screw the cable adjuster "E" in or out as necessary to bring the gear shifter to the position shown at "N" in Fig. Z12. The measurement from the machined face of the cover to the end of the gear shifter outer tube will then be $\frac{3}{16}$ in. Tighten the pinch screw "D," making sure that there is a little clearance between the locking arm and the gear shifter. Lack of clearance may result in the clutch being held partly out of engagement, so causing clutch slip when the starting lever is operated.

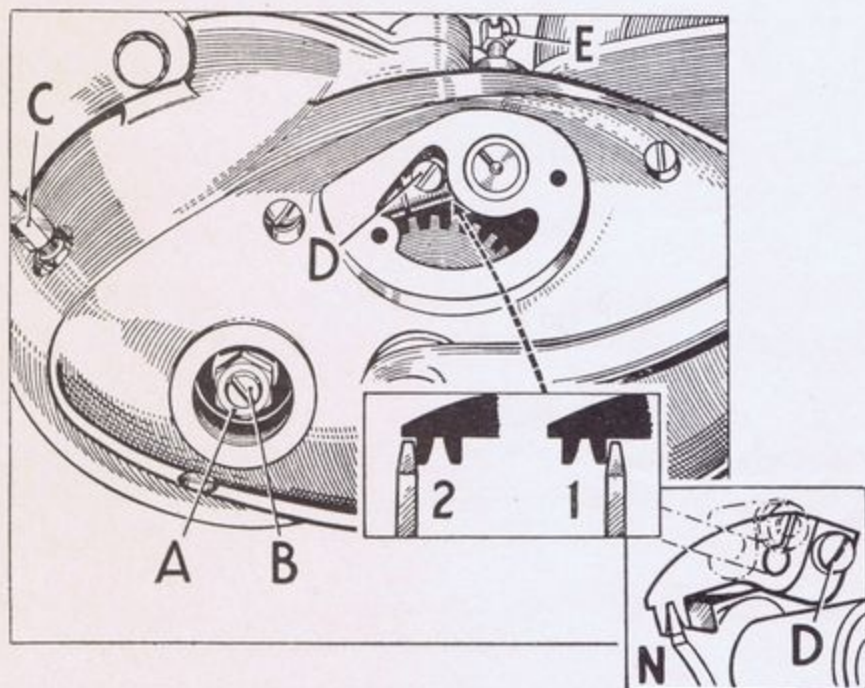


Fig. Z12. Adjusting Clutch and Pre-Selector.

Replace the rear wheel and check the engagement of both gears. It may be found necessary to alter the cable adjustment slightly either way to obtain positive selection.

Finally, refill the gearbox with $\frac{1}{2}$ pint (190 c.c.) of the correct grade of oil (40 S.A.E.). This will bring the level up to the lower edge of the hole provided for clutch pushrod adjustment. Re-fit the starting lever and tighten the pinch bolt.

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Dandy 70

REMOVAL OF WHEELS, ADJUSTING, DISMANTLING, AND RE-ASSEMBLING HUBS AND BRAKES

FRONT WHEEL REMOVAL AND REPLACEMENT

Screw in the brake cable adjuster and disconnect the cable from the operating lever. Alternatively, the lever itself may be taken off by unscrewing the nut "A," Fig. Z13, from the cam spindle. If a speedometer is fitted, detach the cable by unscrewing the union nut from the drive gearbox. Do not lose the fibre washer from inside the nut.

Take off the wheel spindle nut "B" and pull out the spindle "C." Support the weight of the wheel and withdraw it from the forks, first moving it over towards the right to disengage the brake anchor pin from the suspension arm. Be careful not to damage the speedometer gearbox (if fitted). This is not fixed to the hub, and it can be lifted away as soon as the wheel is clear of the forks.

Replace the wheel by reversing the order of the above instructions. When re-fitting the speedometer gearbox, the driving arm must be located in the hole provided for it in the hub flange.

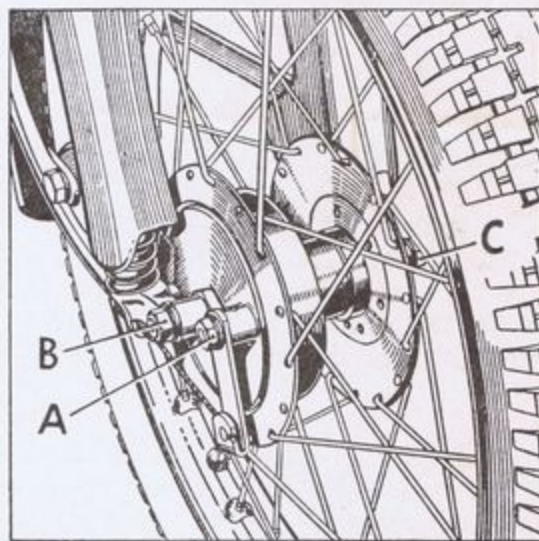


Fig. Z13. Front Wheel Removal

It is important that the brake anchor pin should be correctly engaged with the suspension arm.

REAR WHEEL REMOVAL AND REPLACEMENT

Slacken the lower bolt "A," Fig. Z14, which secures the brake anchor strap to the fork end, and disengage the strap from the peg in the brake plate. Remove the brake operating rod adjusting nut. Unscrew one of the wheel spindle nuts "B," and pull out the spindle "C." Take out the spacing collar on the right-hand side, move the wheel forward as far as possible and lift the chain off the sprocket. This can be done without disconnecting the spring link. Lean the machine to one side, or raise the rear end, and withdraw the wheel.

Replacement is carried out in the reverse order to that for removal. Between each wheel spindle nut "B" and the fork ends there is a large washer. These washers should be positioned behind the chain adjusting screws "E" as the wheel spindle is passed through, otherwise the chain adjusters would have to be screwed right out to clear the washers.

CHAIN ADJUSTMENT

Turn the rear wheel slowly while checking the up and down movement of the chain until the tightest point is found. The total movement at this point should be $\frac{3}{4}$ in. To adjust, loosen the wheel spindle nuts slightly and move the wheel backwards or forwards as necessary by means of the chain adjusting screws "E." When the correct setting has been achieved tighten the wheel spindle nuts and the locknuts on the chain adjusters.

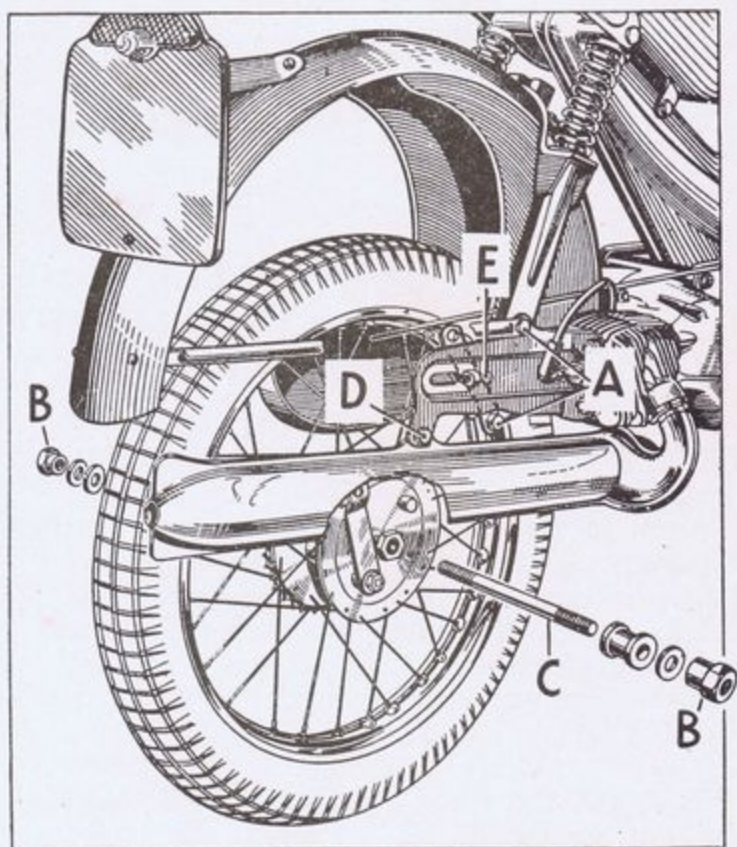


Fig. Z14. Rear Wheel Removal.

BRAKE ADJUSTMENT

The front brake is adjusted by means of the cable adjuster mounted on the right-hand suspension arm. Release the locknut "A," Fig. Z15, and turn the adjuster "B." Finally, tighten the locknut.

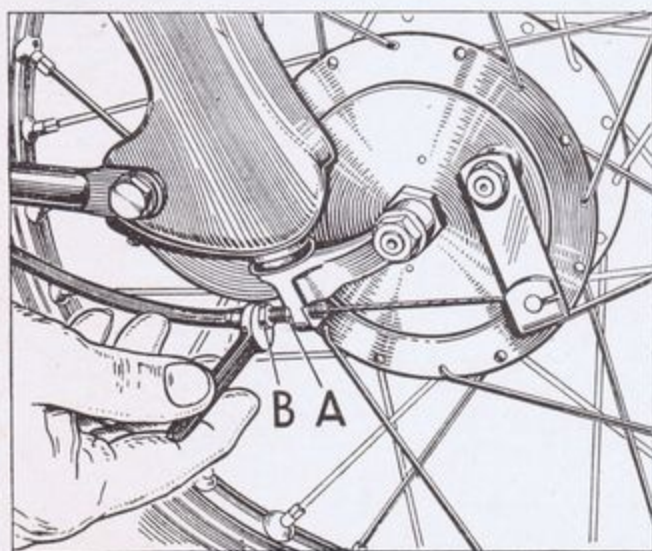


Fig. Z15. Front Brake Adjustment.

Rear brake adjustment is effected by turning the knurled nut at the end of the operating rod.

A further adjustment can be made to both brakes by moving the operating lever to a different position on the cam spindle. The spindle has a squared end, while the hole in the lever is serrated. The best position is that which results in the lever and the cable (or rod) forming a right-angle when the brake is on.

After adjusting the brakes, raise each wheel in turn clear of the ground and check that it spins freely. Binding brakes waste power and, by causing overheating, may distort the brake drums. Also, melted grease from the bearings may impregnate the brake linings.

WHEEL BEARING ADJUSTMENT

When the bearings are correctly adjusted, there should be about 1/64in. side play noticeable at the wheel rim. The method of adjustment is the same for both wheels.

Slacken the locknut "A", Fig. Z16, on the nearside end of the distance tube and turn the cone by means of the knurled ring "B." Fully tighten the locknut and check the side play. Too tight adjustment will cause serious damage to the bearings.

DISMANTLING THE HUBS AND BRAKES

Front and rear hubs are of similar construction; the cups, cones, ball bearings, brake shoes, springs and brake cams being identical.

Remove the locknut "A," Fig. Z16, and unscrew the adjusting cone "B." The brake assembly with the distance tube, fixed cone and locknut attached, can be withdrawn from the right-hand side of the hub. Take care not to lose the 1/4in. ball bearings, of which there should be twelve in each side. The bearing cups are pressed into the hub and can be driven out with a suitable drift. When fitting new cups, ensure that they are pressed squarely into position.

Normal maintenance consists of cleaning out bearings and re-packing with grease at intervals of not more than 10,000 miles. If the machine is used in all weathers, or in very dusty conditions, it is wise to carry out this work more frequently.

The distance tube is detached from the brake plate by unscrewing the locknut; the fixed cone can also be unscrewed if desired. Each brake shoe is retained by a split pin and washer. When these have been removed, the shoes can be prised away from the plate until the spring tension is relieved and the ends of the shoes disengaged from the cam and fulcrum pin.

RE-ASSEMBLING

Replace the shoes in the same manner, hooking on the springs, place the ends of the shoes in position and press outwards and downwards on to the plate. Refit the retaining washers with new split pins. Brake linings should be renewed before the rivets begin to touch the drums. If the rivets are allowed to score the drums, the efficiency of the brakes can only be restored by fitting new hub shells or by having the surfaces skimmed in a lathe.

Re-assemble the bearings, using the recommended type of grease.

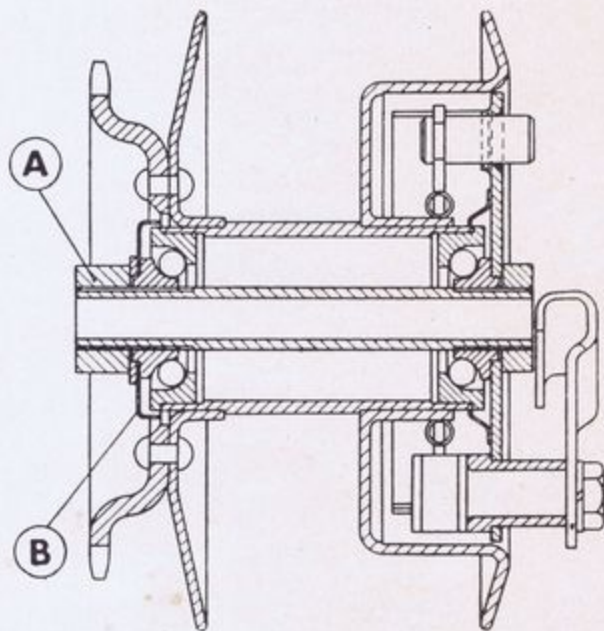


Fig. Z16. Rear Hub Arrangement.

BSA SERVICE SHEET No. 907

June 1957

Dandy 70

FRAME AND FORKS

The front forks are of the leading link type and require no adjustment. The only maintenance necessary is lubrication of the suspension arm bushes every 1,000 miles by applying a grease gun to the nipples provided, as shown in Fig. Z17.

DISMANTLING THE FORKS

Remove the front wheel as described in Service Sheet No. 906. Detach the brake cable from the right-hand suspension arm by unscrewing the adjuster. Take out the two pivot bolts, which also secure the mud-guard stay. Unscrew the two bolts holding the upper ends of the fork springs. These will be found inside the legs of the forks. The arms with springs attached can then be taken away. If it is desired to change the springs, they can simply be unscrewed from the scrolls formed on the arms. The top scrolls are screwed out in a similar manner.

The pivot bearings in the arms are composed of a bush and distance tube, with a dust cap at each end of the bush.

RE-ASSEMBLING THE FORKS

Screw the springs firmly on to the top and bottom scrolls. Pass each spring up inside the fork legs and replace the top bolt. Assemble the pivot bearings in the arms and guide them into position, using a suitable piece of rod for lining up with the bolt holes.

STEERING HEAD ADJUSTMENT

With the front wheel clear of the ground, test for play by grasping the handlebars as shown in Fig. Z18 and attempting to rock the steering head up and down. If any play is present, the bearings require adjustment.

Slacken the locknut "B," Fig. Z19, and turn the adjusting nut "C" until the play has been taken up. Do not over-tighten or the steering will be stiff, and the ball races may be damaged. Tighten the locknut firmly.

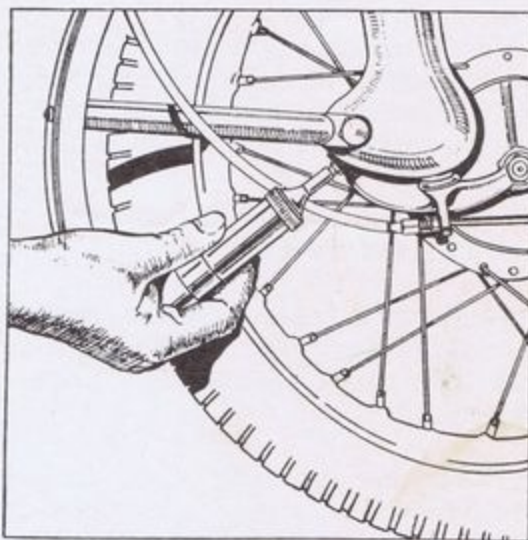


Fig. Z17. Greasing Front Forks.

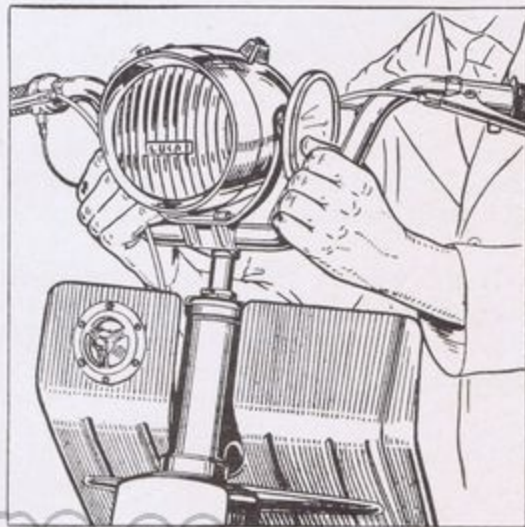


Fig. Z18. Checking Steering Head.

DISMANTLING THE STEERING HEAD

Remove the front wheel, as described in Service Sheet No. 906. Unscrew the bolt "A," Fig. Z19, a few turns and tap it down to release the handlebar stem expander cone. Pull the handlebars up out of the steering head. Take off the two nuts "B" and "C" while supporting the weight of the forks. Then, lower the forks until the steering column is clear of the frame. Take care not to lose any of the ball bearings; there should be twenty-four $\frac{3}{16}$ in. balls in the upper cup, and twenty $\frac{1}{4}$ in. balls in the lower cup.

These bearings require cleaning out and re-packing with grease at intervals of approximately 10,000 miles.

RE-ASSEMBLING THE STEERING HEAD

Re-assemble the bearings, using fresh grease, and adjust as described above. Replace the front wheel and handlebars. Line up the latter squarely with the wheel and tighten the bolt "A" securely.

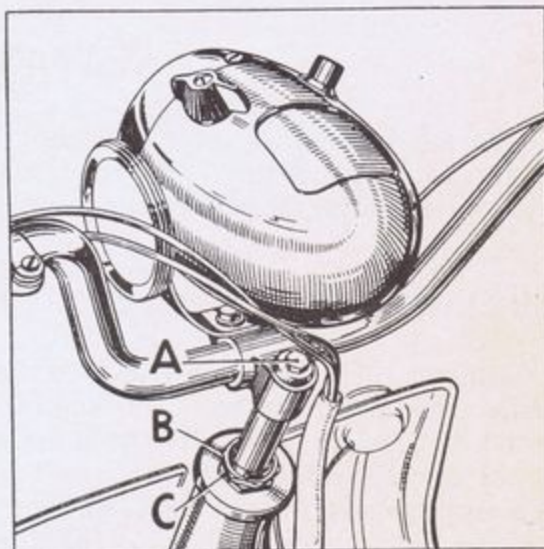


Fig. Z19.
Steering Head Adjustment.

THE REAR FORKS

The lower extremities of the rear forks are held by two bolts on each side to the chain-case and swinging arm plate. The two suspension springs are mounted on top of the forks by means of special fixing plates and nuts and bolts. No lubrication or adjustment is necessary.

The bushes on which the engine and rear forks pivot are of the rubber silentbloc type. These require no attention and have an extremely long life.

WHEEL ALIGNMENT

At intervals, and particularly after the rear wheel has been moved, the alignment of the wheels should be checked. Set the front wheel straight ahead and place a long straight edge alongside the two wheels. It should touch the tyres in two places on each wheel simultaneously.

An even more accurate method is to measure the distances between the straight edge and the rims at the front and rear of each wheel, since the sides of the tyres may not always be perfectly true. These measurements should all equal.

If the wheels prove to be out of line, it may be that one of the chain adjusters has been screwed in or out more than the other. If this point is in order, then the result must lie in the frame or forks and they should be returned to a B.S.A. Dealer for checking over.

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