



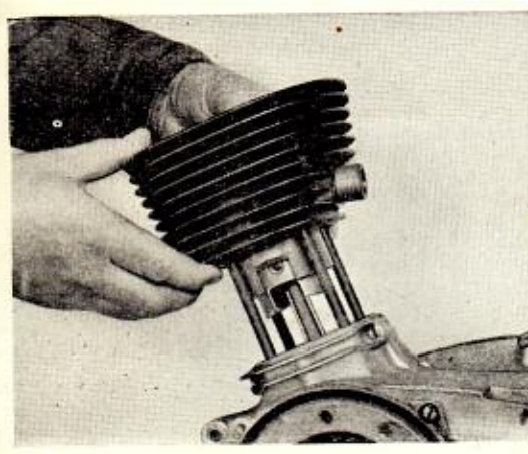
SERVICE CHART

DISMANTLING and RE-BUILDING the BANTAM ENGINE-GEARBOX UNIT

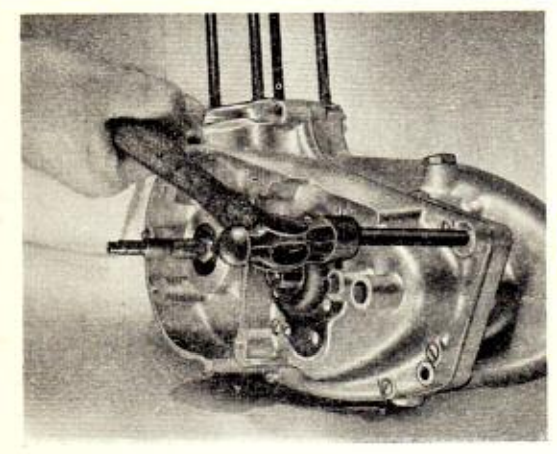


MODELS

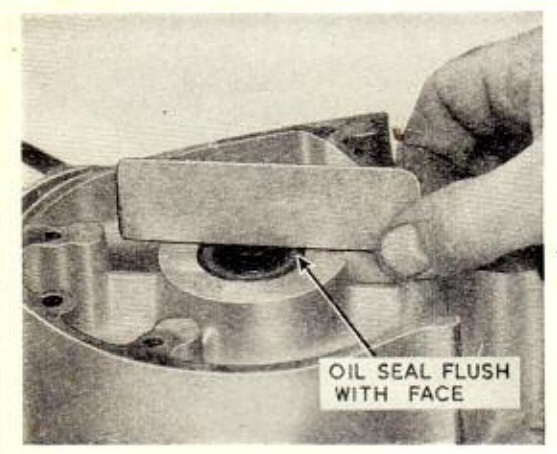
125 c.c.	Two Stroke	D 1
150 c.c.	"	D 3
175 c.c.	"	D 5
175 c.c.	"	D 7



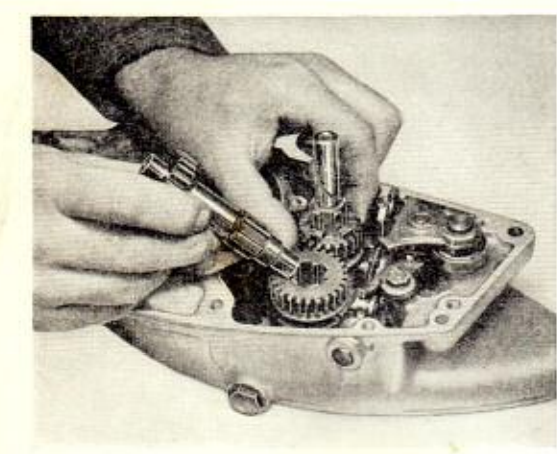
1 Before the crankcase halves can be parted the cylinder and piston must be removed. Take off the four nuts on top of the cylinder head and lift off the head. The barrel can now be lifted but the piston must be supported as it emerges from the barrel otherwise it may be damaged as it falls clear. To remove the piston prise out one of the gudgeon pin circlips then drive the gudgeon pin out from the opposite end. If the pin is tight warm the piston with rags dipped in hot water and wrung out. Mark the piston inside the skirt to show which way it is fitted.



7 Drive out the two dowels from the top engine mounting lugs and remove the eleven cheese-headed screws to part the crankcase. Later models have two additional screws, one just below the final drive sprocket and the other inside the primary drive case behind the top run of the chain. Do not attempt to prise the two halves apart with a screwdriver, this will damage the joint faces, and cause loss of compression. The crankshaft is mounted on three ball races, two on the drive side and one on generator side. The larger races can be pressed out from the outside of the case after it has been warmed, and the small race is pressed out from the inside. On engines after numbers DD.101 and DD.35138, a circlip has been incorporated between the oil seal and main bearing on the generator side, the seal being outside the bearing.

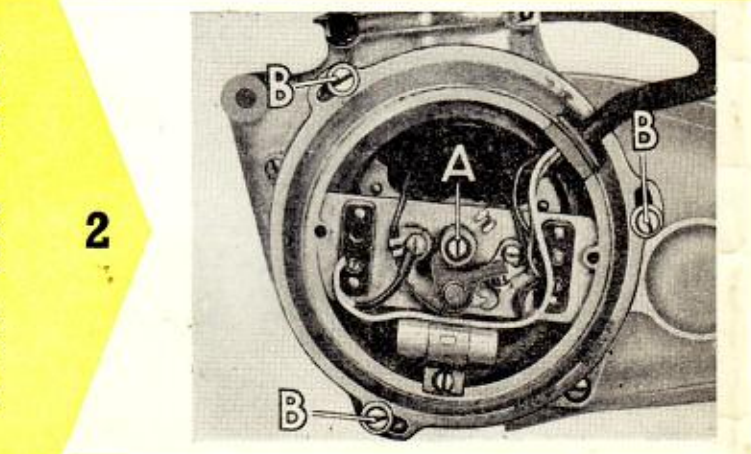


13 CRANKCASE When new ball races or bushes are to be fitted, warm the case, support it to avoid damage, and press in the new parts in the appropriate positions. On DI engines manufactured before 1955 the oil seal is located between the two drive side main bearings. Later DI models and all D3, D5 and D7 engines have a different oil seal which is located next to the flywheels inside both main bearings. On the generator side, the oil seal is fitted, lip upwards, outside the main bearings and flush with the outside face of the crankcase.

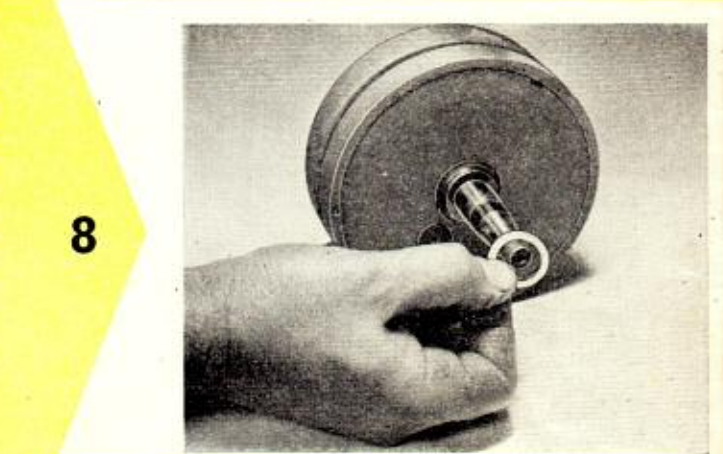


19 Mesh together the smaller mainshaft sliding gear and the larger layshaft sliding gear so that the former has the dogs facing upwards and the latter has the flat face upwards, and place both in position, then insert the layshaft through both its gears and into its bush in the crankcase. If the primary gear (or sleeve pinion) has been removed it can also be placed in position over the mainshaft to mesh with the small layshaft pinion.

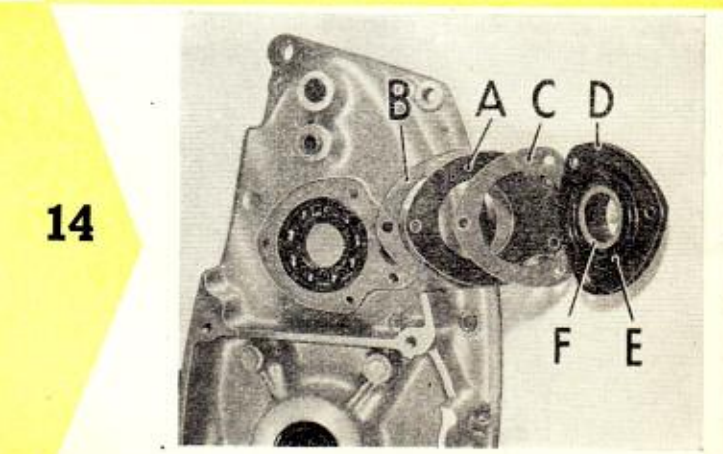
FLYWHEEL GENERATOR (Wico-Pacy) On the nearside of the engine, three cheese-headed screws (B) slotted for withdrawal with a screwdriver and located in elongated slots, and one screw (A) in the centre of the contact breaker mechanism, hold the ignition coil and contact breaker assembly cover in position. MODEL D7 The model D7 differs slightly from the other D group machines in that to obtain access to the generator, the pear shaped cover on the left-hand side of the unit must be removed by taking out the three screws, after this, the procedure for dismantling is identical. Note that the screw (A) in the centre of the contact breaker mechanism also secures the contact breaker cam which is keyed onto the mainshaft. The cam will fall from the shaft as the large alloy cover is withdrawn, and care must be taken to see that neither the cam nor its key is lost during this operation.



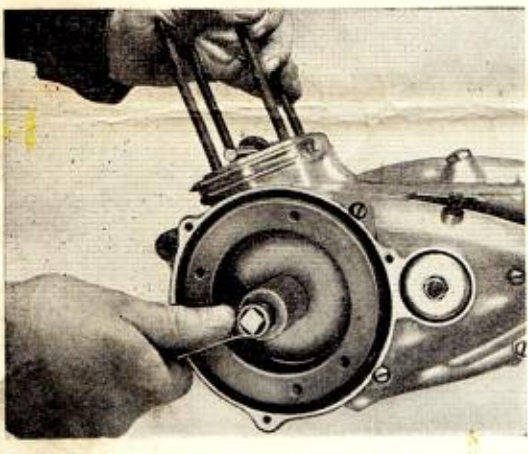
2 On the drive side, the oil seal is located inside both bearings on DI engines after 1954 and all D3, D5 and D7 engines. Earlier models have the oil seal between the two main bearings. Take note of the number and thickness of any shims fitted either side of the flywheel assembly; and also of the crankshaft distance collar between the flywheels and bearing on the generator side. This collar has been replaced by an oil drag fan on later models. It is advisable at this stage to test the big-end bearing for wear. This is done by taking hold of the connecting rod stem and pulling it upwards until the crank is at top dead centre. Then holding it in this position try gently but firmly to pull and push the rod in order to feel whether there is any play.



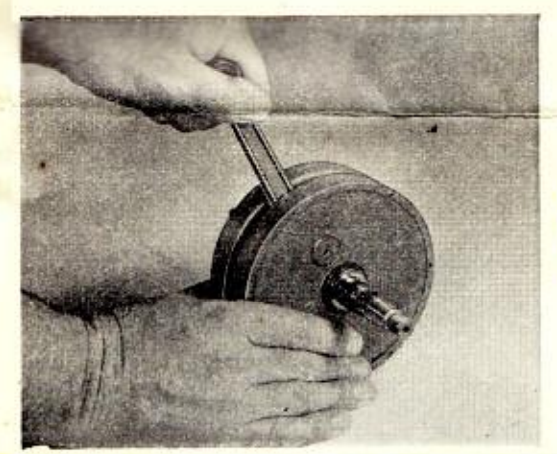
8 Replace the spring loaded ball socket in its recess in the bottom of the offside crankcase. If the gearbox phosphor bronze bushes have been renewed, bolt the two crankcase halves together and line-rearm the bushes, using Service Tool number 61-3199 and Reamer number 61-3205. Make sure that all swarf is removed after this operation. Secure the gearbox mainshaft ball race and layshaft bush retaining end plate (A) on the nearside case with its two 3/16 in. cheese-headed screws, followed by the triangular oil seal housing washer (C), the mainshaft oil seal housing (D) and the oil seal (E), with the steel sleeve (F) in the centre of the assembly. Note that a gasket (B) is fitted between the end plate and the crankcase.



14 Apply jointing compound evenly to the edge of one crankcase and allow it to become "tacky". Insert the gear position indicator spindle, into its bearing hole in the nearside crankcase, and attach the indicator lever (if fitted), to the outer end of the spindle, pointing upwards. Place the nearside crankcase in position, passing the engine mainshaft and gearbox pinion sleeve through their respective races, taking care that the ball end of the inside gear indicator lever enters its recess on the gear selector arm. Later models do not have this indicator its place being taken by a thrust pad. Secure the two crankcase halves together by means of the eleven cheese-headed screws (thirteen on later models), tightening them evenly all round to avoid distortion. Note that a spring washer is fitted under the head of each screw.



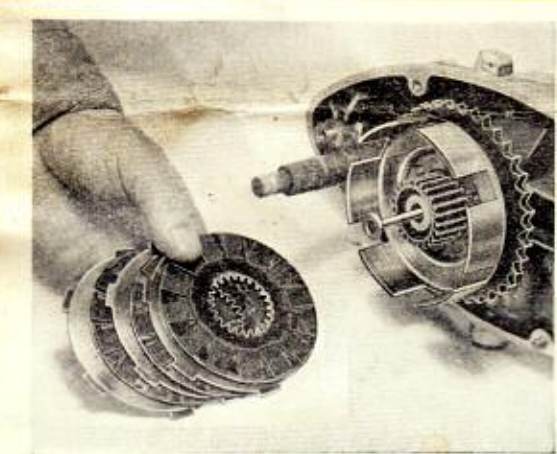
3 The right-hand threaded nut holding the flywheel must now be unscrewed to allow the withdrawal of the flywheel. Service Tool number 61-3188 is used for this operation. Note that a large shakeproof washer is fitted between the nut and flywheel boss. On machines with Wico-Pacy equipment, two short screws inside and three long screws outside secure the alloy flywheel housing cover in position. REMOVAL OF LUCAS GENERATOR When Lucas equipment is fitted, the cover is retained by three long screws only. The dismantling of the engine unit is identical with the exception of the removal of the Generator. Remove the three screws and take off the cover. Take off the four 1/2 in. nuts holding the stator and remove the centre bolt securing the cam and rotor. Insert the extractor tool number 90-297, screw up tight to remove the rotor from the mainshaft.



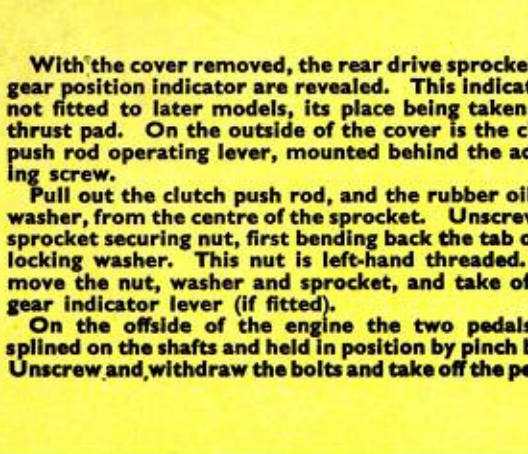
9 There should be no play, although it may be possible to rock the rod sideways, i.e., at right angles to the axis of the machine. If vertical play is perceptible in the big-end it must be decided whether the amount in evidence is permissible or not. If it has been decided that the big-end bearing must be replaced the flywheels should now be parted, using Service Tool number 61-3206. Place the flywheels in the bolster and position the stripping bars Service Tool number 61-3208. Use the punch Service Tool number 61-3209 to drive out the crankpin. Take off the uppermost flywheel and reverse the lower one in the bolster. Again using Service Tool number 61-3209 drive out the crankpin.



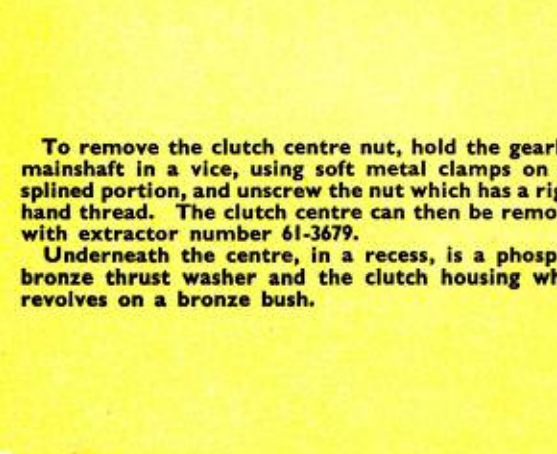
15 It is not advisable to attempt to take up wear in the big-end assembly by fitting oversize rollers, since the connecting rod, rollers, and crankpin are carefully matched before leaving the works. We strongly recommend that a complete replacement assembly be used. This can be obtained through your dealer. The big-end assembly having been renewed and the flywheels checked for balance and concentricity. Make sure the flywheel side plates are tight in their recesses and secured by "dot" punching. Note—No side plates are used on the D5 or D7 models. The next step is to check the end float of the flywheel assembly in the crankcase, and adjust if necessary. Shim washers of various thicknesses are supplied for this purpose.



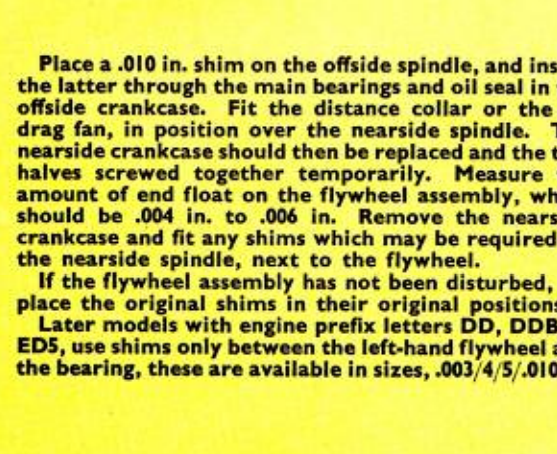
21 Enter the clutch push rod into the hole in the centre of the shaft. The clutch plates are now inserted into the centre of the chainwheel assembly, cork plate first then steel plate in sequence, the last plate being the domed clutch actuating plate. Insert the six springs into the cups and place them in the holes in the spring plate, the raised centre of the plate outwards. Using Service Tool number 61-3191, compress the springs, and place the large circlip into its groove on the inside of the clutch plate housing.



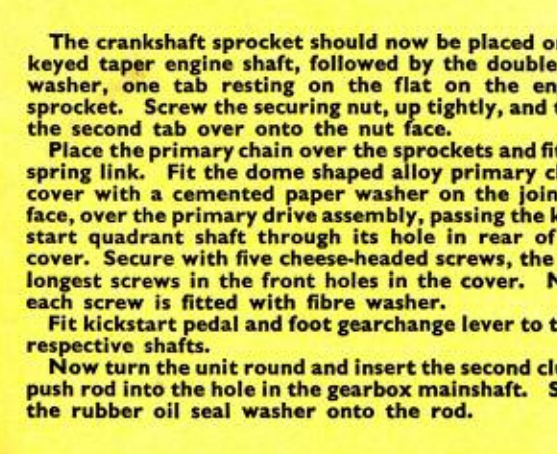
4 With the cover removed, the rear drive sprocket and gear position indicator are revealed. This indicator is not fitted to later models, its place being taken by a thrust pad. On the outside of the cover is the clutch push rod operating lever, mounted behind the adjusting screw. Pull out the clutch push rod, and the rubber oil seal washer, from the centre of the sprocket. Unscrew the sprocket securing nut, first bending back the tab of the locking washer. This nut is left-hand threaded. Remove the nut, washer and sprocket, and take off the gear indicator lever (if fitted). On the offside of the engine the two pedals are splined on the shafts and held in position by pinch bolts. Unscrew and withdraw the bolts and take off the pedals.



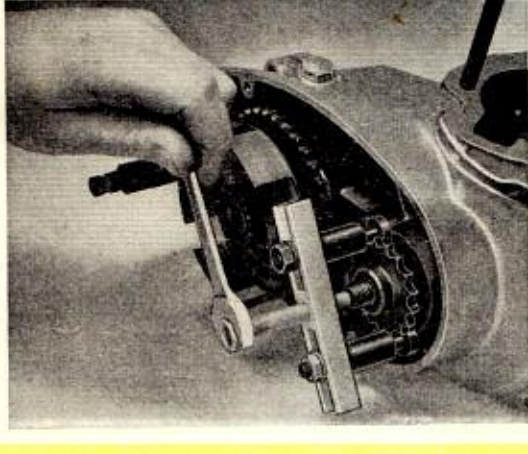
10 To remove the clutch centre nut, hold the gearbox mainshaft in a vice, using soft metal clamps on the splined portion, and unscrew the nut which has a right-hand thread. The clutch centre can then be removed with extractor number 61-3679. Underneath the centre, in a recess, is a phosphor bronze thrust washer and the clutch housing which revolves on a bronze bush.



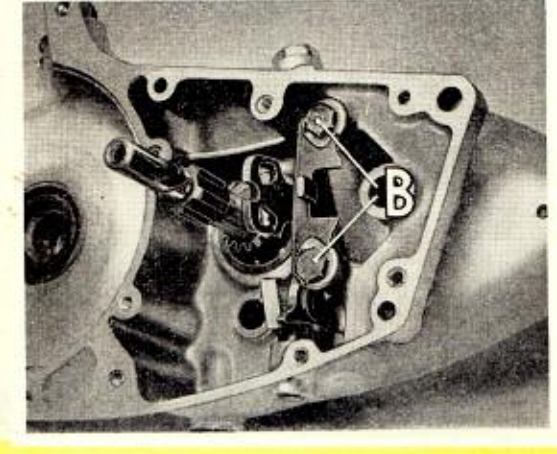
16 Place a .010 in. shim on the offside spindle, and insert the latter through the main bearings and oil seal in the offside crankcase. Fit the distance collar or the oil drag fan, in position over the nearside spindle. The nearside crankcase should then be replaced and the two halves screwed together temporarily. Measure the amount of end float on the flywheel assembly, which should be .004 in. to .006 in. Remove the nearside crankcase and fit any shims which may be required on the nearside spindle, next to the flywheel. If the flywheel assembly has not been disturbed, replace the original shims in their original positions. Later models with engine prefix letters DD, DDB or ED5, use shims only between the left-hand flywheel and the bearing, these are available in sizes, .003/4/5/010 in.



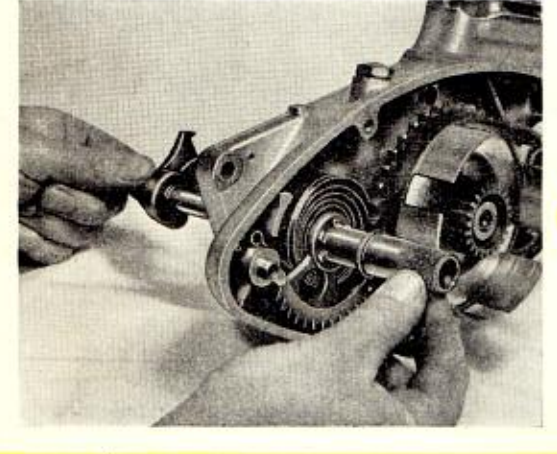
22 The crankshaft sprocket should now be placed on its keyed taper engine shaft, followed by the double tab washer, one tab resting on the flat on the engine sprocket. Screw the securing nut, up tightly, and turn the second tab over onto the nut face. Place the primary chain over the sprockets and fit the spring link. Fit the dome shaped alloy primary chain cover with a cemented paper washer on the jointing face, over the primary drive assembly, passing the kickstart quadrant shaft through its hole in rear of the cover. Secure with five cheese-headed screws, the two longest screws in the front holes in the cover. Note each screw is fitted with fibre washer. Fit kickstart pedal and foot gearchange lever to their respective shafts. Now turn the unit round and insert the second clutch push rod into the hole in the gearbox mainshaft. Slide the rubber oil seal washer onto the rod.



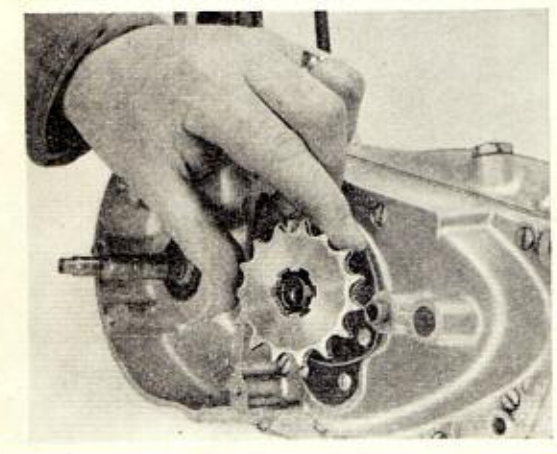
5 Unscrew the five cheese-headed screws, two long ones at the front of the alloy primary drive cover, three at the rear, and this cover can be taken off, revealing the engine sprocket, primary chain, clutch assembly, kickstart quadrant and clock-type spring. The keyed engine sprocket is held on its taper shaft by means of a right-hand threaded nut and double tab washer, one tab of which must be turned back from the engine sprocket securing nut before unscrewing. Unscrew the nut and take off the tab washer. Remove the primary chain by releasing its spring link and using Service Tool number 61-3198, pull the engine sprocket from its tapered keyed shaft, and remove the key.



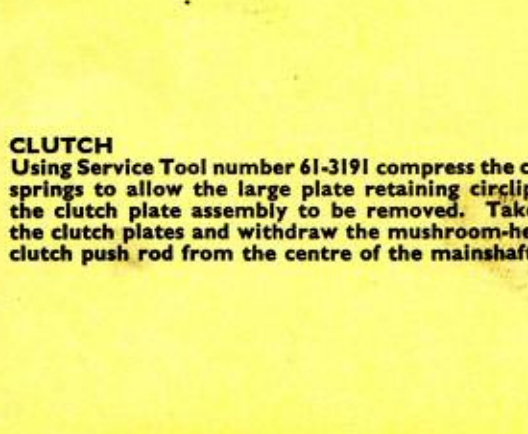
11 GEARBOX The kickstart ratchet spring is secured in position by a circlip and pressed metal collar. Take off the circlip and collar and remove the kickstart ratchet pinion. The gearbox control shaft carries on its serrated end inside the case a gear selector claw. This is held in position by a circlip and fitted around the boss of this claw is a double-ended coil spring. This is housed inside a metal cover. The two ends of the spring fit one either side of a peg driven into the claw, and also pass over a projection on the bridge piece of the gear selector mechanism, thus acting as a centralising device for the claw. The bridge piece is secured by two 1/2 in. bolts (B) and locking washers to the alloy case, and carries the gear selector quadrant, on a central pin positioned by a spring and plate. The end of the gear selector quadrant is located in a spring loaded plunger pressed into the bottom of the alloy case.



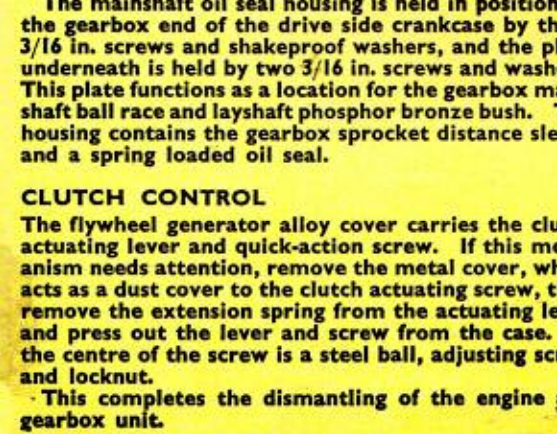
17 Pass the splined end of the gearbox mainshaft through the bearing in the right-hand half-case, and grip the splined portion of the shaft in a vice using soft metal clamps. Place the bronze clutch centre bush over the outer end of the shaft, then the clutch housing, which should be complete with kickstart ratchet and spring, and complete the assembly with the bronze thrust washer and clutch centre. Secure with the single nut and plain washer. Place the kickstart spring and quadrant in position with the circular plate between the spring and the case and the end of the spring in the recess above the dowel hole. Give one turn of the spring to tension it and engage the quadrant against the stop below the dowel hole.



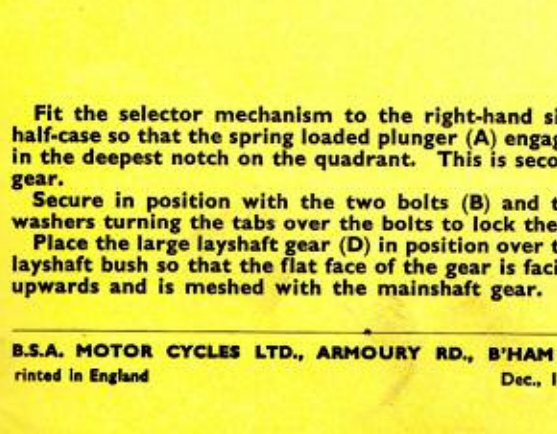
23 The gearbox sprocket, is pushed onto the splines projecting through the gearbox, and secured by nut and splined washer, which is turned over onto the nut as a locking device. The flywheel generator alloy cover carries the clutch actuating lever and quick-action mechanism, which is pressed into this cover from the inside when the cover has been warmed. A flat on the collar of the actuating screw positions this part in the cover. In the centre of the quickaction screw is a ball and adjusting screw with locknut. The metal cover presses over the quick-action screw from the outside of the cover. Attach the extension spring to its hole in the lever and the hole in the inside of the cover. Place the crankcase outer cover in position on the nearside case. This cover carries the clutch operating lever and adjuster. Five cheese-headed screws, two inside and three outside, secure the cover to the crankcase.



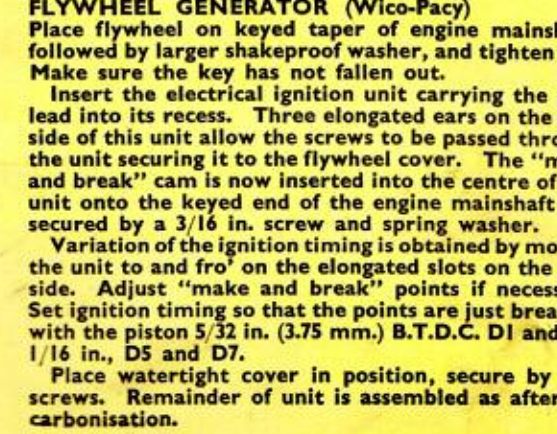
6 CLUTCH Using Service Tool number 61-3191 compress the clutch springs to allow the large plate retaining circlip and the clutch plate assembly to be removed. Take out the clutch plates and withdraw the mushroom-headed clutch push rod from the centre of the mainshaft.



12 The mainshaft oil seal housing is held in position on the gearbox end of the drive side crankcase by three 3/16 in. screws and shakeproof washers, and the plate underneath is held by two 3/16 in. screws and washers. This plate functions as a location for the gearbox mainshaft ball race and layshaft phosphor bronze bush. The housing contains the gearbox sprocket distance sleeve and a spring loaded oil seal. CLUTCH CONTROL The flywheel generator alloy cover carries the clutch actuating lever and quick-action screw. If this mechanism needs attention, remove the metal cover, which acts as a dust cover to the clutch actuating screw, then remove the extension spring from the actuating lever and press out the lever and screw from the case. In the centre of the screw is a steel ball, adjusting screw and locknut. This completes the dismantling of the engine and gearbox unit.



18 Fit the selector mechanism to the right-hand side half-case so that the spring loaded plunger (A) engages in the deepest notch on the quadrant. This is second gear. Secure in position with the two bolts (B) and tab washers turning the tabs over the bolts to lock them. Place the large layshaft gear (D) in position over the layshaft bush so that the flat face of the gear is facing upwards and is meshed with the mainshaft gear.



24 FLYWHEEL GENERATOR (Wico-Pacy) Place flywheel on keyed taper of engine mainshaft. Place the electrical ignition unit carrying the plug lead into its recess. Three elongated ears on the outside of this unit allow the screws to be passed through the unit securing it to the flywheel cover. The "make and break" cam is now inserted into the centre of this unit onto the keyed end of the engine mainshaft and secured by a 3/16 in. screw and spring washer. Variation of the ignition timing is obtained by moving the unit to and fro on the elongated slots on the outside. Adjust "make and break" points if necessary. Set ignition timing so that the points are just breaking with the piston 5/32 in. (3.75 mm) B.T.D.C. DI and D3, 1/16 in., D5 and D7. Place watertight cover in position, secure by two screws. Remainder of unit is assembled as after de-carbonisation.