BSA SERVICE SHEET No. 606

"M" Group Models

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REMOVING ENGINE FROM FRAME AND COMPLETE DISMANTLING

The procedure for the removal of the engine from the frame and dismantling will be described from the point reached in the previous Service Sheet when the cylinder head and barrel had been removed. The oil pipes must next be disconnected, but first the oil tank should be drained. Alternatively the pipes can be disconnected and suitably plugged.

Detach the leads to the dynamo (both of which are held by a small plate and one screw), and then the earth wire adjacent to the contact breaker housing. Follow these with the sparking plug lead.

The magneto control cable can be readily detached from the handlebar lever.

REMOVING CHAINCASE.

The oil bath chaincase follows next. Take off the footrest and then undo all the screws round the rim of the chaincase. The nuts of these screws are welded to the other half of the case and so cannot be lost. When the outer chaincase cover is taken off, careful note should be made of the positioning of the cork washers and distance pieces, to facilitate replacement. Before removing the chain loosen clutch as described in next paragraph, and then dismantle engine shaft cush drive. Tap the lock washer clear of the slot in the cush drive retaining nut and unscrew the latter. Then withdraw the spring and cam sleeve, leaving the sprocket and chain in position. Next, take off the clutch.

REMOVING CLUTCH.

This can be accomplished with the aid of an extractor (shown in Fig. M36) after removal of the clutch outer cover, the actuating cap and the central sleeve nut. The extractor screws into the thread provided inside the clutch centre. Now uncouple the chain, the spring link being of the usual "hairpin" type. Take off the clutch as a unit and then the cush drive. There now remains the inner half of the chaincase, which is held to the crankcase by three bolts, wired together for locking purposes, and by a nut attaching the rear chainguard to the case. The nut can be released easily after the chaincase is pulled off the crankcase register.

The bolts holding the crankcase to the front and rear engine plates can now be removed and it is advisable to release the gearbox bolts in the case of the rear plates, since the latter clamp both gearbox and crankcase lugs between them. The frame bolt at the bottom of the front engine plates should be slackened off so that the plates may be swung forwards, greatly facilitating removal of the engine

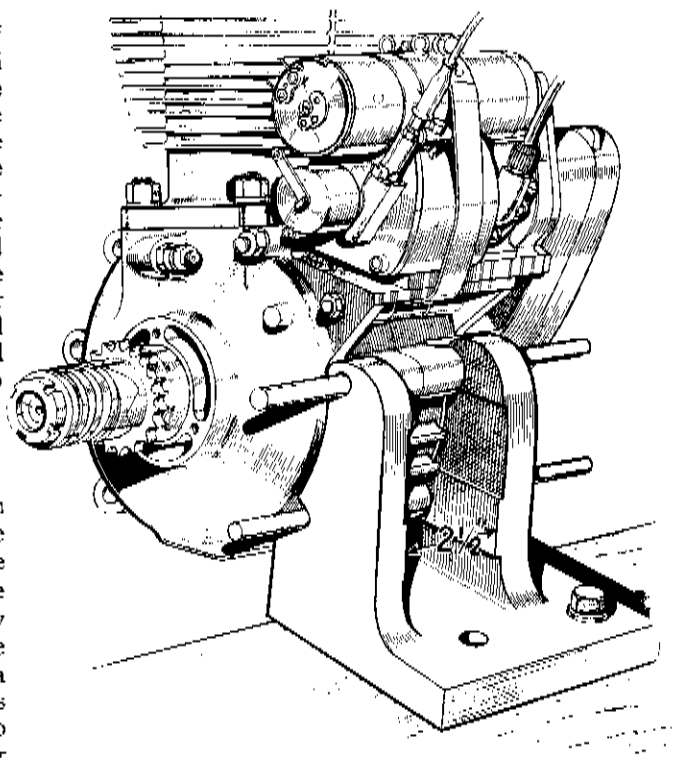


Fig. M15. Angle bracket for mounting engine.

DISMANTLING THE ENGINE.

It is advisable before commencing to dismantle the engine to construct a simple fixture such as that shewn in Fig. M15 on which the engine can be

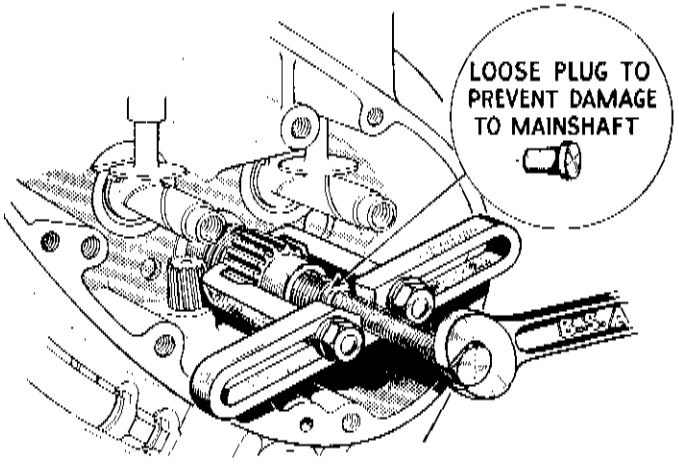


Fig. M16 Engine shaft pinion extractor 61-1735.

mounted. Alternatively, a lug on the crankcase may be clamped in a vice and the crankcase itself supported on the bench.

Attention may next be given to the crankcase portion of the engine. Take off the timing cover, and if any difficulty is experienced in releasing the screws, it will facilitate matters if a long screwdriver is used, and the head given a sharp tap with a mallet. On some models an oil tell-tale is fitted on the timing cover and this must also be taken off. It is possible that the jointing compound on the face between the cover and crankcase will not allow the cover to be removed easily and in this event, the lugs on the ends of the cover should be used to tap it off. Take care not to damage the small nozzle in the timing cover which feeds oil to the hollow crankshaft; if it should be re-fitted in a bent condition, it will foul the mainshaft, and break off eventually, thus starving the big-end and piston of oil.

REMOVING MAGDYNO PINION.

Next, the magdyno pinion should be removed. Since the pinion fits on to a taper shaft difficulty may be experienced in removing it. It is not advisable to attempt to prise the pinion off with levers, as there is grave risk of breaking the timing case, but it will come off quite easily provided an extractor Service Tool 61-1903 is used. Note that there is a special oil seal fitted in the timing case, behind the magneto pinion. It is only necessary to release the magdyno strap bolt, when the straps can be swung on one side, and the magdyno lifted off. The latter is located by dowels only, and if any shims were fitted below the magdyno they should be carefully preserved.

The engine shaft nut should be removed and the plate holding the timing gears in position is detached by removal of the six fixing bolts, three of which screw into the crankcase casting and have coarse threads, while the remaining three screw into the pinion spindles and have fine threads. All the pinions can now be withdrawn with the exception of the engine shaft pinion which may require an extractor. The latter is shown in Fig. M16, and in order to prevent damage to the engine mainshaft, a flat headed pin of suitable dimensions should be inserted in the oil hole, in the manner illustrated. If the pinions are re-bushed they should be reamed out to .6255 ins./.6250 ins. for the cams and .7505 ins./.7495 ins. for the idler pinion. The correct size for the outrigger bearing in the timing gear plate is .815 ins./.814 ins.

Before the oil pump spindle is released it is first necessary to remove the locking plunger which is exposed after removal of the timing cover (Fig. M17). Take care not to lose the loose washer covering the plunger. If the latter cannot easily be removed with the fingers, a timing cover screw should be screwed into the plunger, when it can easily be withdrawn. If it is necessary to remove the pump take off the sump cover

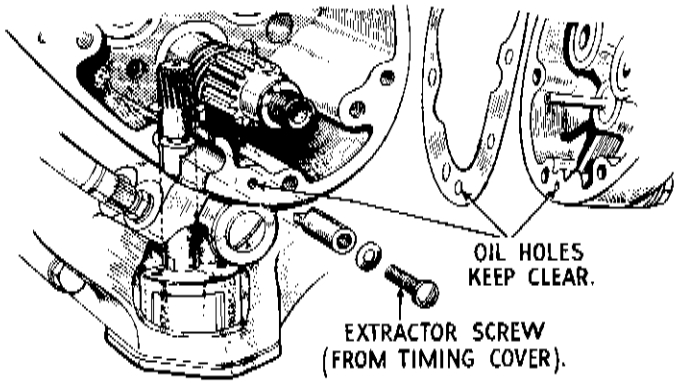


Fig. M17. Oil pump spindle locking plunger.

plate, together with the filter and joint washers, and remove the two bolts holding the pump in position, thus releasing the pump. These two bolts are the ones with spring washers under the heads; the other two bolts hold the pump parts together and should not be disturbed unless it is strongly suspected that the pump is giving trouble.

The crankcase is now ready for "splitting." Release all the bolts round the crankcase joint face (the magdyno strap hinge pins also act as bolts and the nut on these must be removed) and draw each half of the crankcase off the engine mainshaft. Where single lipped roller bearings have been used in the engine, the outer race will remain in the crankcase and if necessary can be pressed out later. It should be remembered that the outside bearing on the drive side has its outer race retained in the crankcase by means of a spring ring which must be removed before extracting the race.

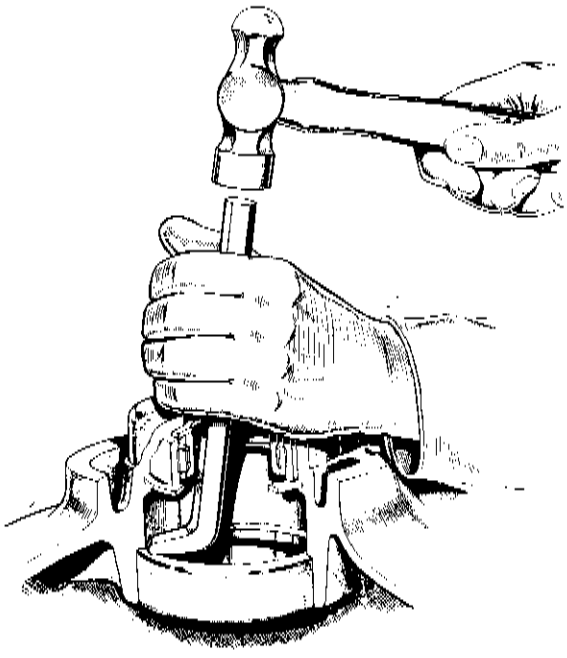


Fig. M19. Ballrace extraction (driveside).

Ball bearings will usually be left on the shafts after removal of the crankcase halves, but should they remain in the crankcase, they may be pressed out of the gearside in an arbor press as shown in Fig. M18. On the drive side the inner bearing must first be tapped out with a punch, projecting through the outer bearing and working all round the bearing to give even extraction (Fig. M19). These operations will be considerably helped if the crankcase is first warmed, the most suitable method being by dipping in boiling water.

If it is desired to remove the cam pinion spindles, they can easily be taken out by means of an extractor (Fig. M20). **Do not remove these spindles unless absolutely necessary.** If the tappets require renewal, then the cam spindles and tappet guides must be removed so that the tappets can be drawn out downwards into the timing case. The exhaust tappet receives special treatment, and should not be replaced by an inlet tappet. The tappet guides unscrew upwards out of the crankcase.

The final item is the flywheel assembly. Remove the locking plates holding the crankpin nuts and take off the latter. They will require an unusu-

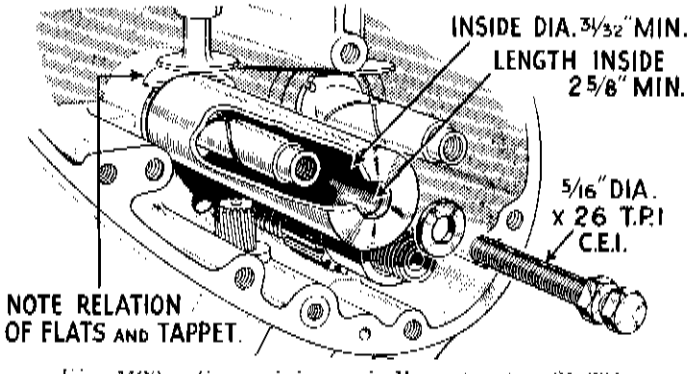


Fig. M20. Cam pinion spindle extractor 61-691.

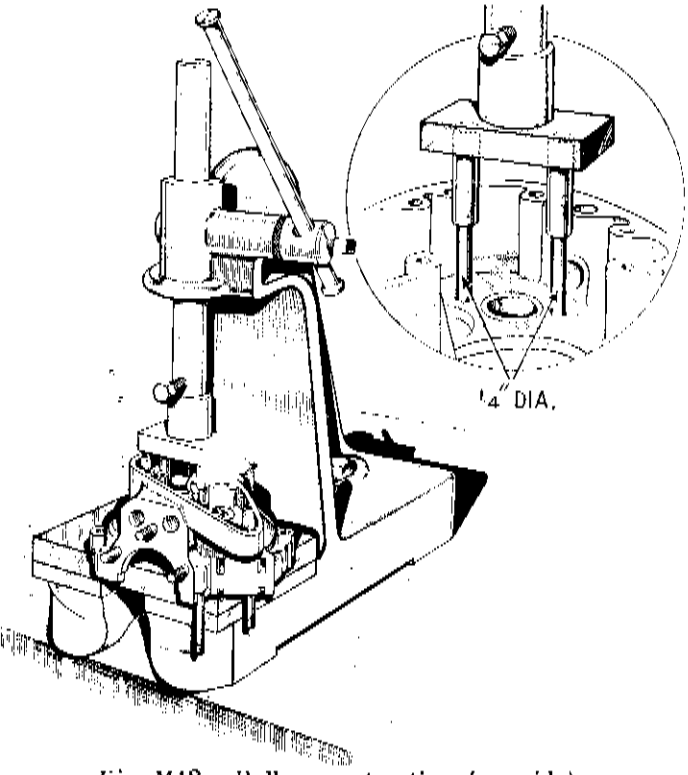


Fig. M18. Ballrace extraction (gearside).

ally large leverage and it may be necessary to add a piece of tubing of suitable size to the spanner before sufficient purchase can be obtained.

The crankpin is a taper fit on the flywheels and can be released by a sharp blow with a mallet.

It is now only necessary to decide which parts require renewal, and the following points may be of assistance in making these decisions.

In the event of big-end wear, we do not advise the fitting of oversize rollers; the whole big-end assembly (consisting of crankpin, rollers and connecting rod), should be changed. All these components are carefully matched by the B.S.A. Co., and supplied in complete sets, ready for fitting.

The bore of a cylinder when new is between 3.2295 ins. and 3.2280 ins. (82mm.) and when the bore (measured at right angles to the gudgeon pin) shows wear to the extent of .010 ins. or more, the liner should then be rebored to ½mm. oversize (3.2487 ins.–3.2477 ins.) and a ½mm. oversize piston fitted. Subsequently, the liner may again be rebored, to 1mm. oversize (3.2684 ins.–3.2674 ins.) and a 1mm. oversize piston fitted.

When wear develops after the second rebore, it is necessary to fit a new cylinder liner. A suitable screw or hydraulic press giving a pressure of between 5 and 7 tons is necessary—first to press out the old liner (which must be pressed out from the base of the cylinder) and then to insert the

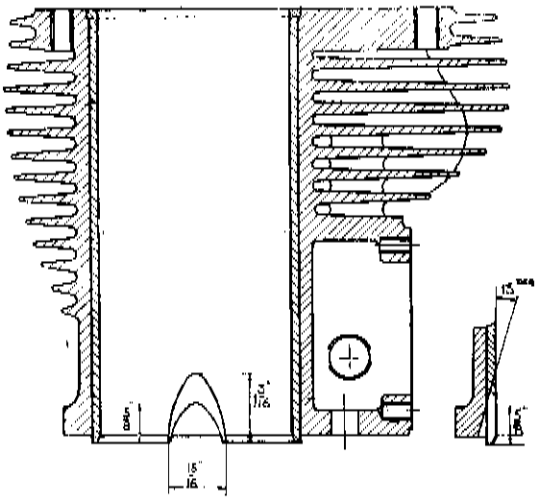
new liner, which is pressed in from the top of the cylinder. Owing to the possibility of the liner "closing-in" during the fitting process, it must be ground to a finished diameter of 3.229 ins. 3.228 ins. when in position.

It is also necessary to grind two scoops at the skirt of the liner at right angles to the gudgeon pin to provide clearance for the connecting rod (see illustration opposite).

A standard piston and rings must of course be fitted when a new liner is used. The piston should be selected so that the clearances between the skirt and the liner fall within the prescribed limits given in Service Sheet No. 704.

After 1951, the cylinder liner was no longer fitted. When it becomes necessary, the cylinder barrel itself can be rebored in the normal way.

Wear in the mainshaft bearings will be readily apparent and bearings showing signs of damaged balls, rollers or tracks should be replaced. Special internal clearances are specified for mainshaft bearings used on B.S.A. motor cycles, and these are "000 clearance" for roller bearings and "00 clearance" for ball bearings. It is not advisable to fit bearings with any other clearance.



Two scoops diametrically opposite, ground after liner is pressed in.

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