

AMC gearbox

Strip and rebuild your AMC gearbox with our step by step guide

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pics: Martyn Barnwell

THE AMC GEARBOX IS ONE of motorcycling's enduring products. This versatile design is fitted to a wide range of machines from plodding Ajay singles to ripsnorting Norton Commandos. Its strength and simplicity make it a firm favourite with specials builders.

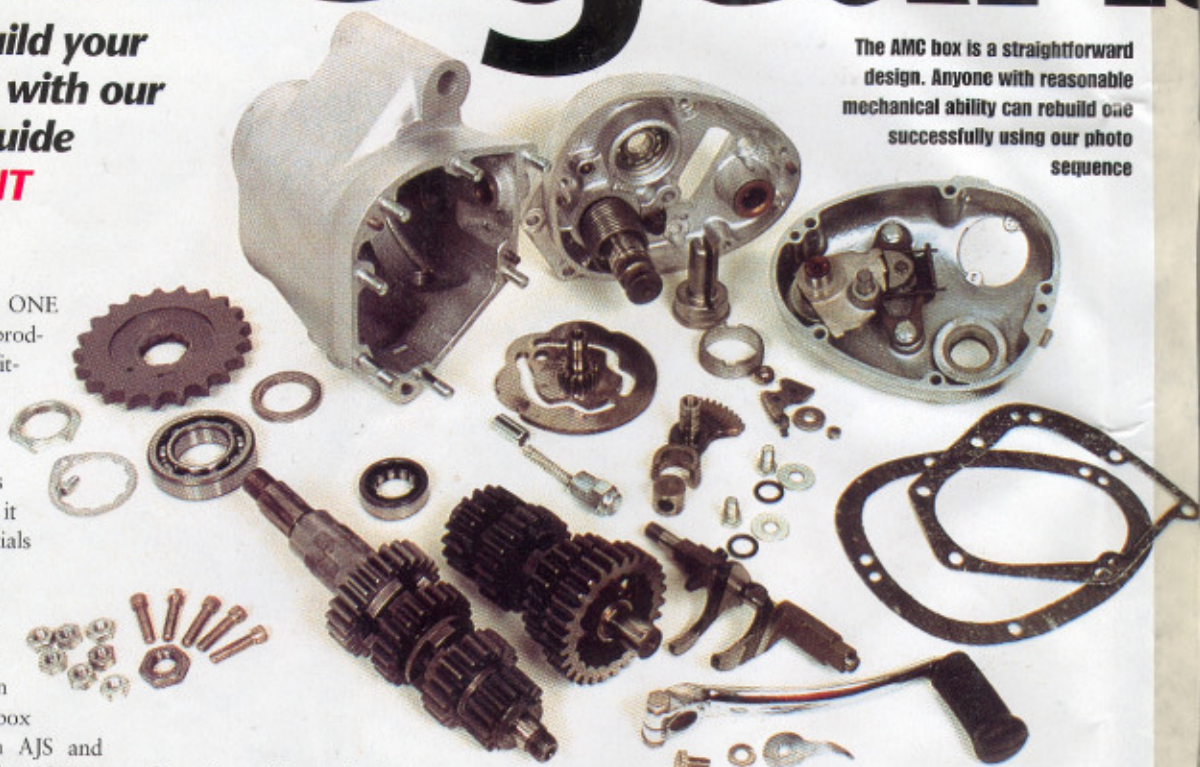
Designed as part of a rationalisation programme following Associated Motor Cycles' takeover of Norton in 1953, the four-speed AMC box first appeared in 1956 on AJS and Matchless heavyweights. In late '56 Norton fitted the box to the 1957 model Dommie 88 and 99, ES2, Model 50 and the International. However the box's ancestry began far earlier than the Fifties. The design is so similar to earlier Burman and even older Sturmey Archer boxes that complete gear sets can be persuaded to fit these earlier designs with minimal engineering work.

The original design survived through to the end of Commando production with few changes. AJS and Matchless boxes had a kickstart spring modification in 1962, and Norton

boxes followed with the same mod in '64. Early boxes are stamped on the top of the main shell with an M for Matchless and AJS machines, and N for Nortons. Following the kickstart spring mod the codes changed to MA and NA respectively.

All Commando gearboxes are stamped on the top mounting boss with the numerical part of the engine number. The 750 Commando boxes are numbered in the 100000 or 200000 series, 850 Commando boxes in the 300000 series. The top mounting boss on Commando gearbox shells is

The AMC box is a straightforward design. Anyone with reasonable mechanical ability can rebuild one successfully using our photo sequence



Stripdown tips

Fasteners have BSF or Cycle threads so you'll need Whitworth spanners or sockets. Don't remove the gear lever



▲ Heat inner cover and then remove clutch lock ring with special tool 01-5800

first because it provides leverage to help you remove the outer gearbox cover.

Mark the inner cover bang in line with cable entry before stripdown. This aids reassembly of the clutch mechanism.

The inner cover must be heated before attempting to remove the clutch lock ring with special Norton tool 01-5800.

The selector rod is threaded and must be unscrewed from the main shell before the selector forks and gears are removed.

The gearbox sprocket nut has a left-hand thread.

A chainwrench made from a



▲ Punch inner cover in line with cable entry before stripdown

short length of rear chain securely fixed to a bar holds the sprocket and makes unscrewing or tightening mainshaft nuts easy.

1 Carefully check all parts for wear or damage before assembly. The mainshaft second gear (above) is most prone to wear, closely followed by the mainshaft first gear. Pitting on teeth renders a gear scrap. Gears should always be replaced in pairs



2 Heat the shell uniformly until the two bearings drop in without force. Replacing the layshaft 6203 ball race with this NJ203E C3 roller bearing increases the layshaft's load carrying capacity and eases assembly. When cool, fit the output seal using Loctite Bearing Fit on the outer edge

Box rebuild

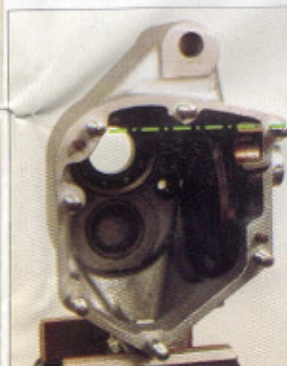
1/8in narrower than earlier boxes to make fitting easier — a separate spacer slots between the boss and the left hand mounting plate once the gearbox is in position.

Commando gear ratios altered from number 128646 when the fourth gear pair of 18T/24T changed to 18T/23T, using stronger teeth to transmit the twin's high power output more reliably. This raises first, second and third gear

ratios but not fourth, which always remains a direct 1:1 with this type of gearbox layout. A further change came on the 850 Commando at 306591 when the second gear pair were changed for a higher ratio to reduce engine revs and help the Commando meet stiffer noise regulations.

Parts availability for the standard Norton-AMC gearbox that Les Emery of the Norvil Motorcycle Co used to demonstrate this rebuild

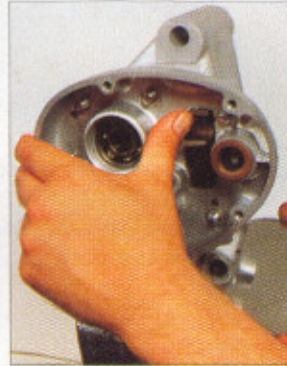
for our benefit is 100 per cent. The Norvil Motorcycle Co can build you a new gearbox or supply a full range of genuine Norton parts from stock. Parts are manufactured by Andover Norton under licence from Norton and meet or exceed the original specification. New gearbox shells are beefed up to make them stronger than the original Norton castings and have a wider gasket face to prevent oil leaks. ▶



3 Fit the selector quadrant. Align the top inner edge of quadrant with centre line of stud and slide camplate into place in fourth gear position. This ensures correct indexing



4 This is the fourth gear detent notch on the camplate. The camplate is in the fourth gear position when this notch lines up with the detent plunger hole in the bottom of the gearbox shell



5 Temporarily fit inner cover and move quadrant to full extent each way. Make sure that the camplate will travel just past the first and fourth detent positions. Use a mirror to check through the detent plunger hole



6 Push in sleeve gear and mainshaft. Assemble third and fourth gear pinions on layshaft, with roller bearing's inner race. The small shoulder on fourth gear faces the flange on the inner race. Slide the partially assembled layshaft into position



7 Fit the selector forks to the mainshaft third and layshaft second gears. Both selector forks are identical. Use the clutch pushrod to locate the forks in position prior to fitting the selector shaft



8 Coat the selector shaft with STP engine treatment but be careful not to get this anti-scuff fluid on the threads



9 Squeeze silicon RTV sealant into the threaded selector shaft hole in the shell and screw in the shaft. Remember to wipe off excess sealant



10 Smear the threads of the quadrant and camplate bolts with the silicon sealant to prevent oil seepage. Loosely fit the two bolts and washers, along with new O-rings



11 Use a soft screwdriver handle to lock the quadrant and nip the two bolts up gently. Fit detent plunger, sealing the threads with silicon sealant. Don't use a sealing washer — this reduces detent spring pressure



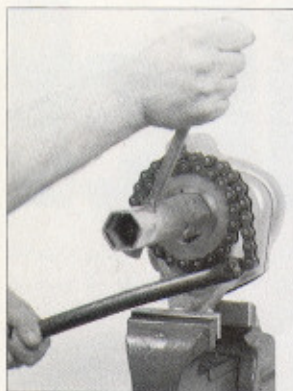
12 Fit mainshaft second and first gears and the layshaft first gear. Longer boss on the mainshaft first gear points outwards. Fit the quadrant roller (top right) now. It won't fit once the inner cover's on



13 Heat inner cover and fit the 1/2 bearing. Allow to cool and assemble kickstart mechanism — pawl locates behind stop plate. Fit new gasket and slide on inner cover. If the cover is tight, use soft mallet to tap into position. Fit and tighten the seven 3/16in nuts



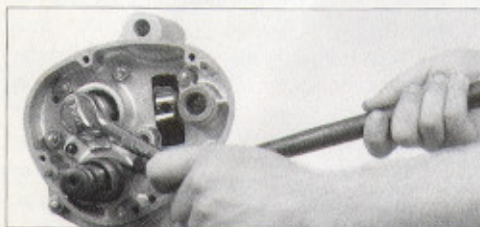
14 Now turn your attention to the other side. Fit oil seal spacer and seal splines with silicon sealant. Oil leaks are often blamed on the output seal when oil is passing under spacer and along sleeve gear splines



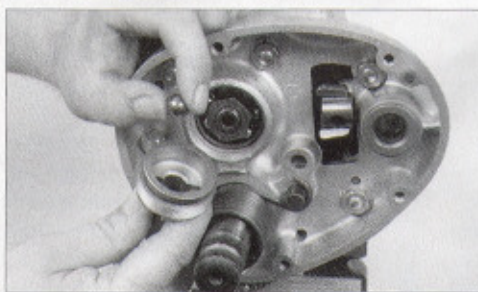
15 Fit the sprocket and its nut with the chamfered side towards the sprocket. Remember that the nut has a left-hand thread. Hold sprocket with your chainwrench and tighten the nut with a 1/2in Whitworth box spanner



16 Fit the sprocket nut's lockplate and retaining screw. You may need to adjust the sprocket nut's position slightly to align the retaining screw holes. Put a dab of Loctite Nutlock on the retaining screw's threads

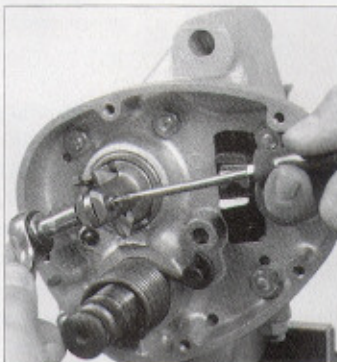
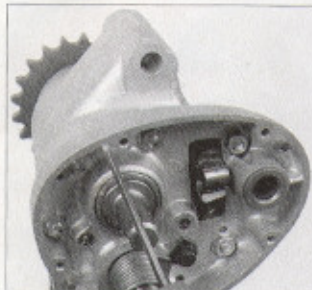


17 Select 4th gear and use chainwrench to prevent mainshaft turning while tightening mainshaft nut with 1/2in Whitworth socket. Torque the nut to 40lb/ft using Loctite. Take care not to damage the bearing cage with the socket, a common cause of premature bearing failure

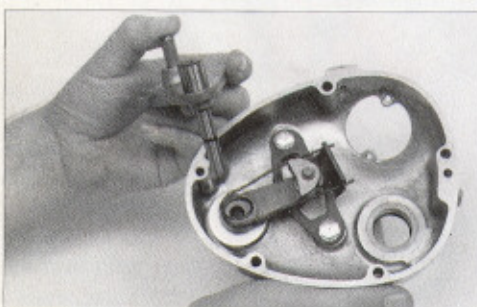


18 Fit the clutch operating lever body, remembering to put the ball bearing inside. Use Loctite on the retaining ring threads, but before tightening fully...

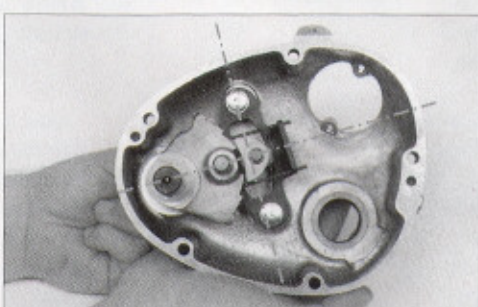
19 ...make sure that the slot in the body aligns with the reference mark you made on the casing before stripdown. A 1/8in AF Allen key is ideal for checking alignment. Get it wrong and the clutch will always be heavy in operation



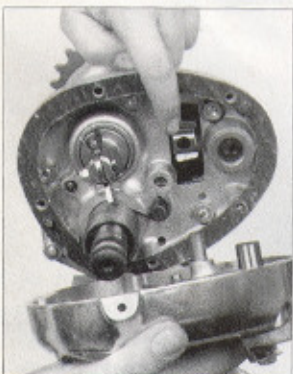
20 Fit the clutch operating lever, inner/outer rollers and use a new 2BA Nyloc nut to retain the lever pivot bolt



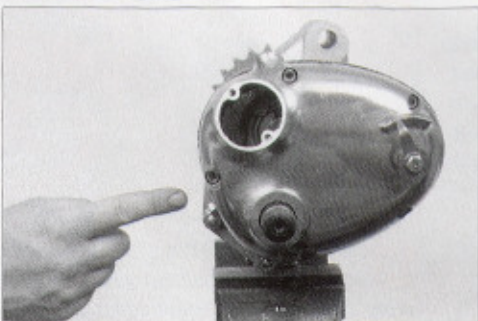
21 Assemble the selector mechanism in the outer cover. The straight leg of the ratchet spring is fitted uppermost. Fit two new O-rings in the cover for the gear lever and kickstart and one new O-ring on the selector shaft



22 When assembled, the spring must hold the pawl at a right angle to the ratchet plate. It's okay to bend the spring legs to achieve this. This adjustment is critical. Missed gears and jumping out of gear are commonly caused by misaligning the pawl



23 Fit a new outer gasket. Oil the kickstart shaft and gear lever bush and replace outer cover using the external gear indicator to locate the selector peg into hole in roller as cover goes home. Refit the five 1/4in BSF cover screws



24 Finally the most important job. Before you forget, fill the gearbox with EP90 gear oil to the level plug

◁ Final drive sprockets are available from 15 to 25 teeth. Les Emery recommends a 21 tooth sprocket as best for road use on a Commando, and a 19T sprocket on a Dominator. Our rebuild features a 750 Commando box but the same sequence of assembly applies to all AMC boxes. Les always smears STP engine treatment on the internals during assembly because of its excellent anti-scuff properties. The box is easy to work on, but take care because, as Emery says, a gearbox lock-up can be fatal ■

What it costs

Gearbox rebuild kit — all bearings	
bushes, springs, O-rings, gaskets	£77
Clutch ring tool 01-5800	£6.96
Individual gears	£32.90 to £86.30
Gearset pro Mk2 Commando	£400.90
Gearset Mk2 on Commando	£419
Gearbox rebuild (labour)	from £65
All prices are from The Norvil Motorcycle Co and include VAT	

Extra info

The Classic Bike archive holds a range of spares lists, manuals and owner's instruction books covering a range of Norton, AJS and Matchless machines fitted with the AMC gearbox. For further details write or fax stating the year and model of your machine. Here's a selection from our stock.

■ **1958 AJS spares list** for 350cc and 500cc singles. Also 500cc and 600cc twins — 60 pages, £6.50

■ **1967 G85CS, G80CS and P11** maintenance and instruction manual — 56 pages, £6

■ **1970 Norton 750 Commando S Type and roadster** rider's handbook — 36 pages, £4

■ **1970 on Norton Commando Models 850 and 750: Interstate, Roadster, Hi Rider, Interpol, Fastback, SS, S Type and Fastback LR** workshop manual — 125 pages, £12.50

Write to Classic Bike, 20-22 Station Road, Kettering, Northants, NN15 7HH. Fax 01536 386782. Make cheques payable to Classic Bike, or quote your Mastercard or Visa details.

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