SERVICE SERIES OF 1954 — No. 11 — by BERNAL OSBORNE

Workshop Data for the Models 498 c.c. and 596 c.c.

SCOTT

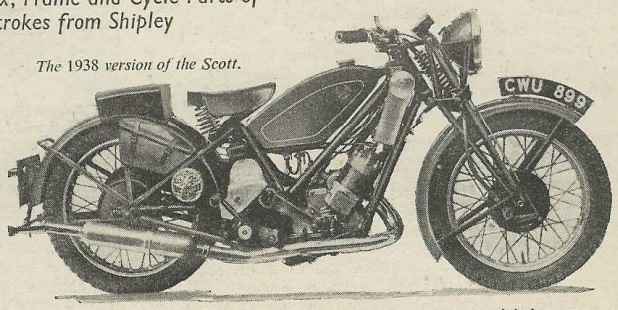
Part II—Attention to the Gearbox, Frame and Cycle Parts of the Water-cooled Two-strokes from Shipley

LIKE the engine of the Scott, dealt with last week, the gearbox of that machine is unconventional. At a time when four-speed boxes were becoming fashionable, Scott practice favoured retention of three ratios. This type of Scott gearbox had itself replaced the two-speed component made at Shipley at a period when other manufacturers were concentrating on three-speeds. There is no suggestion of Scott backwardness in that statement, for it has long been acknowledged that the good, low-speed torque of the Scott water-cooled two-stroke, plus its slow-revving characteristics, makes the fitting of a four-speed gearbox unnecessary. Indeed, for the new Scott being developed by Aerco Jigs and Tools, Ltd., of Birmingham, three ratios only are used.

In getting to work on the gearbox, seeming difficulties may arise from the fact that the primary drive comes from the centre of the double crankcase and, therefore, the clutch appears to be inaccessible. When the cowling is removed, however, it will be seen that there is an extended mainshaft and outrigger bearing arrangement supporting the clutch assembly. Removal of the outrigger bracket and bearing and the withdrawal of the final-drive sprocket leaves the clutch unencumbered.

Complete gearbox dismantling can be commenced here by removing the kickstarter end-plate and taking down the gear-change mechanism which it carries. Items which may need renewing in the gear-change mechanism are the two coil springs, used to control the simple pawl arrangement, the pawls themselves or the short linkage of rods which operate the bell crank.

The 1938 version of the Scott.



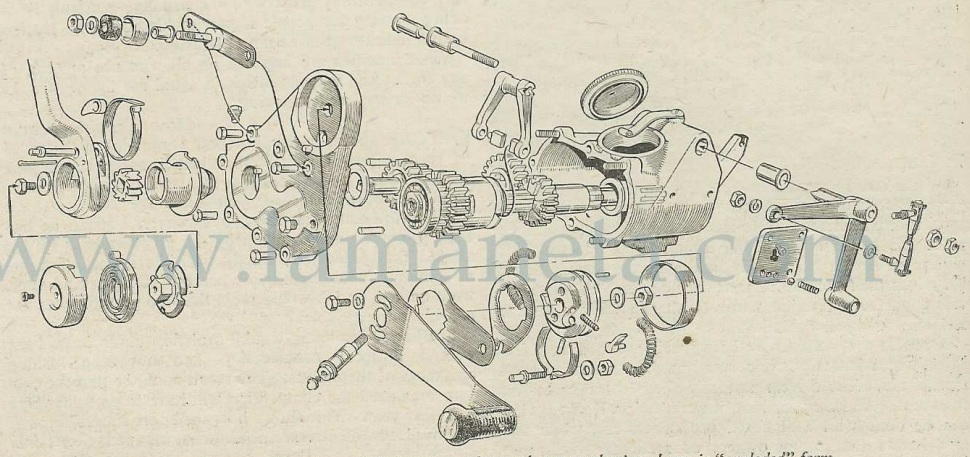
Movement of the bell crank is limited by the engaging of the spring-loaded ball in the lower crank arm with dimples in a face-plate. Both the ball and the plate are of hardened steel, but, in course of time, a certain amount of wear is inevitable and also there is a possibility of the spring losing its strength. Therefore, if the selection of gears has been unsatisfactory, these parts should be inspected with a view to possible replacement.

The bell crank is supported by two phosphor-bronze bushes pressed into the top of the gearbox and reamed to ⅝ in. when new. If wear is apparent here, it is not a difficult task to extract the bushes and fit new ones. The reaming size quoted is exact, tolerances being allowed for in the finished size of the bell-crank shaft. This practice applies to all Scott shaft-and-bush-fitting dimensions; in other words, if a "round-figure" reaming size is indicated, there is no need to worry further about working tolerances as the shaft will have been machined at the Works to suit.

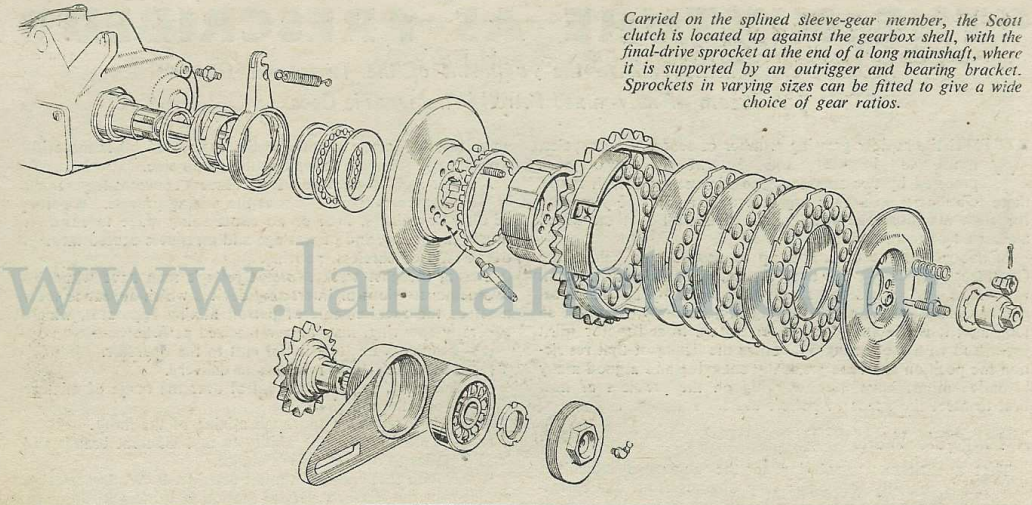
This bell-crank shaft keys with the top of the gear-operating fork member, and at the points where the fork-ends engage with the moving dog-clutch member hardened-steel shoes are used to minimize wear—see arrow in main gearbox illustration—and these are easily replaceable if necessary.

Shaft-support on the drive side of the gearbox is provided by a flanged bush pressed into the shell. This bush carries the sleeve pinion (Scotts call it the high-gear wheel), which in turn is sleeved with two phosphor-bronze bushes in which the mainshaft runs. At its extremities the mainshaft is carried on ball-journal bearings, these being housed in the cover at the kickstarter end and in the outrigger bracket at the drive end. The last-mentioned bearing is retained by a screw-in end cap, and is lubricated by a grease nipple screwed into the end of the cap.

A wide variety of gear ratios becomes available by fitting alternative types of sprocket. See the Useful Data panel. Moreover, from 1934 onwards wide- or close-ratio gears were available and details of these also are listed.



The Scott three-speed gearbox with kickstarter and gear-change mechanism shown in "exploded" form.



Carried on the splined sleeve-gear member, the Scott clutch is located up against the gearbox shell, with the final-drive sprocket at the end of a long mainshaft, where it is supported by an outrigger and bearing bracket. Sprockets in varying sizes can be fitted to give a wide choice of gear ratios.

Scotts, in a pre-war instruction book, claimed to have "admittedly the finest gearbox on the market." Not everybody, perhaps, will associate themselves with this somewhat sweeping statement, but when carrying out practical work on this Scott component, one certainly gains appreciation of its sturdiness and of the generally good engineering methods employed.

The Clutch

The clutch assembly is situated between the gearbox shell and the outrigger end plate. Whereas in modern gearbox design the clutch is mounted on the mainshaft, transmitting the primary drive to the layshaft and then to the sleeve-gear and final-drive sprocket, Scott arrangements are slightly different. Here the clutch assembly rides on the splined sleeve-gear member, which transmits the primary drive to the layshaft and *then* to the mainshaft. It is the mainshaft, therefore, that provides the final drive, the sprocket for this purpose being located on splines next to the outrigger bracket bearing.

The clutch sprocket member and three insert plates are lined with asbestos material and there are also three plain plates and a spring carrier plate. Note the employment of a thrust race, similar to that fitted in a Velocette clutch, to push out thrust pins and relieve surface pressure when declutching. A reasonable amount of slack in the control cable is necessary, otherwise there is likely to be constant pressure on the race and, therefore, rapid wear.

Should it be necessary to do so, the whole of the clutch can be dismantled without disturbing the gearbox. In this case, first detach the final-drive sprocket and the outrigger bracket, and disconnect the chain. The hexagon-headed screws carrying the clutch springs may then be taken out and the springs removed. The clutch body and plates are now accessible and can be dismantled. Take care that the 30 rollers forming the clutch bearing do not roll away and get lost.

Lubrication

A quick-action filler cap is provided and Scotts recommend that, for the three-speed gearbox, lubricant of S.A.E. 30 or S.A.E. 50 viscosity should be used. There is an oil-level plug situated in the lower forward end of the kickstarter cover. It is recommended that the outrigger bearing be repacked with grease at 5,000-mile intervals.

Scott girder forks, on earlier models, have an oil cap on the top lug for the lubrication of the sliding fork crown. There are two oil caps for the lubrication of the fork guides and in both cases oil and not grease should be used. Later models fitted with the Brampton "Monarch" or Webb-pattern forks are equipped with nipples for grease lubrication.

The hubs of all models should be packed on assembly with medium grease and this should suffice for approximately 3,000 miles. That is the advice given in Scott's instruction book, but, in practice, an even greater mileage is possible.

Hub Details

During the long period of manufacture at Shipley, the Scott company used a variety of wheels but, in the main, favoured the Royal Enfield type with built-in cush drive and Timken adjustable taper roller bearings. On some of the later models non-adjustable ball-journal bearings were used.

Front wheel bearings are, almost without exception, of the ball-journal type and the Hoffmann LS7 pattern can be fitted as replacements.

Suspension

For the man rebuilding a Scott, front fork replacements may produce a headache, due to shortage of spares. Some parts are available from Aerco Jigs and Tools, Ltd., and also from H. C. Webb and Co., Ltd., Tame Road, Witton, Birmingham 6. The immediate post-war model, based largely on 1938-1939 design, specified Dowty forks and these may solve the problems of many owners of second-hand Scotts. Note that, of the several types of Dowty fork equipment available, the model catering for a lug depth of 7.522 in. was used for the 1946 Scott. It may be of interest to note that alternative lug depths catered for by Dowty Equipment, Ltd., of Cheltenham, were 6.87 in., 6.68 in., 6.75 in., and 6.96 in.

B11

USEFUL DATA

Transmission:
Primary $\frac{1}{2}$ in. by .305 in. 68 pitches.
Secondary $\frac{3}{8}$ in. by $\frac{3}{8}$ in. 94 pitches.

Mainshaft Bearings: (outrigger and k.s. side). Self-aligning double-row ball journal bearings, dimensions: O/D $2\frac{1}{2}$ in. by $1\frac{1}{4}$ in. bore by .625 in. wide.

Inner Sleeve Gear Bushes: (two off) I/D .750 in.

Outer Sleeve Gear Bush: (flanged bush pressed into gearbox shell) I/D $1\frac{5}{16}$ in. (reamed).

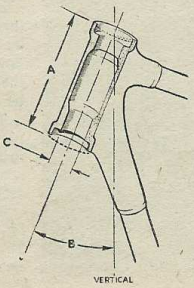
Gear Ratios: (1934 onwards).

Wide Ratio Box

Driving Sprocket	Top	Second	First
22 teeth	4.00	5.80	11.52
21 ,,	4.18	6.08	12.20
20 ,,	4.40	6.40	12.70
19 ,,	4.62	6.72	13.30
18 ,,	4.19	7.16	14.10
17 ,,	5.17	7.52	14.90
16 ,,	5.50	7.97	15.85

Close Ratio Box

22 teeth	4.00	5.26	8.53
21 ,,	4.18	5.50	8.90
20 ,,	4.40	5.78	9.37
19 ,,	4.62	6.16	9.90
18 ,,	4.90	6.44	10.40
17 ,,	5.17	6.80	10.98
16 ,,	5.50	7.20	11.69



Steering-head dimensions for the Scott frame, as shown in the diagram, are (A) 7.522 in., (B) 27°, (C) 20 $\frac{1}{4}$-in. balls in cup-and-cone-type races top and bottom, O/D of cup 2 in., I/D $1\frac{1}{4}$ in.