SERVICE SERIES OF 1954 — No. 13

by BERNAL OSBORNE

## Overhauling the 1934-5 Model X34-0 and B34-1/2

# B. S. A.s

### Part I—*Practical Work on 149 c.c. o.h.v. and 249 c.c. o.h.v. and s.v. Machines from Small Heath*

THIS instalment of the series deals with slightly more ancient history than usual, the reason being that there has been a steady demand for information about the little " 150 " produced by the B.S.A. concern at a time when, due to the introduction of the tax concession for that class, there was a big drive by the industry to cater for a new category. That the " 150 " of the early and mid-1930s was later superseded by the 125 c.c. two-stroke did not necessarily reflect on the efficiency, or reliability, of the former. Indeed, in the rural districts of Britain many of these little models, cheap to buy in the first instance, continue now to give good day-in, day-out service, some 20 years after they left the assembly line. The B.S.A. X34-0 149 c.c. o.h.v. model, made in 1934, was listed at £29 17s. 6d. complete with lights!

These were the days also of the popular " 250 " and B.S.A.'s 249 c.c. B34-2, was, in many respects, similar to the baby of the range. And save for the disposition of the valves, the 249 c.c. s.v. version, listed as the B34-1, had much in common with the two o.h.v. machines.

The X34-0 was continued only for 1935 but the lives of the two " 250s " were extended to form the basis of the " C " models, held in high regard for the subsequent decade. Actually, the bore and stroke dimensions of 63 mm. by 80 mm., are still employed.

Unfortunately the makers are not in a position to assist with a spare-parts service but most of the major wearing components such as the drive-side ball journal bearing, or the big-end rollers, are standard proprietary articles. The bushes used are not difficult to make up and details are given as fully as possible in the Useful Data panel.

#### Dismantling Procedure

All the o.h.v. mechanism is exposed and can be dismantled without the use of special tools. Lubrication at these points is by application of a grease gun and, provided that H.M.P. lubricant is used, this arrangement, though not ideal, is generally satisfactory. The plain rocker spindles are pushed in from the drive side and carry hardened steel washers to take rocker thrust. The rocker components bear directly on the spindles and are not bushed. A domed dust cap, secured by two screws, gives ready access to this assembly. Valve clearance is measured at the point of impact of the rocker arms and the ends of the valves, and adjustment is provided for at the tops of the two push-rods. Wear in all these parts where precise contact is essential can be corrected by the " Stellite " hardening process; valves and rockers in particular react well to this form of renovation.

#### The Top End

Double-coil valve springs are fitted and the cylinder head, which is of the cast-iron type, can be scavenged by immersion in a caustic-soda solution if so desired. The valve-guides are slightly shouldered and, for this reason, if new ones are made up, take care to see that, of the total length of the guides, 1 5/32-in. has a diameter of .5625/.560-in. the remainder being .571./.568-in. The total length of the guides should be 2 1/16-in. Almost all engine reconditioning specialists will undertake reboring work and the fitting of oversize pistons.

No small-end bush is used. At a pinch, the eye which, in as-new condition, measures .6255/.6250-in., can be bored out and bushed for use with some suitable, smaller-than-standard pin. But here difficulty will arise on account of the sleeve-type end-pads employed; these parts are made of Duralumin and they have an outside diameter of .439/438-in. extended to .595/.593-in. at the head. Two plain compression rings are fitted to the flat-topped piston.

#### Crankcase Components

Noisy running or perceptible up-and-down play in the big-end bearing and/or mainshafts, is indicative of the need to split the crankcase halves and investigate. The big-end rollers measure ¼-in. by ½-in. and are easily replaceable. They run in a crank-pin track .503/.504-in. wide; the diameter of the track should be .9681/.9679-in. Oversize rollers, if obtainable, can be fitted to compensate for slight wear but, if the track surface is scuffed or dented—however minutely—O/S rollers are really only a short-lived palliative.

On the drive-side the shaft is supported by a Hoffman MS9 ball journal bearing which should be available from bearing suppliers, if not B.S.A.s. The shaft on the timing side is carried in a bush the dimensions of which are, bore .8755/.8745-in., O/D 1.1255/1.1245-in. with a .002-in. taper on the O/D. Beyond the ball bearing is fitted a dished oil-retaining washer with, on its outer side, a thrust washer and felt ring.

Case-hardened mild steel is used for the two tappet guides and there are four cam-pinion bushes (see the Useful Data panel for dimensional details).

#### Lubrication

The three models are amongst the last-of-the-line total-loss, wet-sump lubrication engines in which the pump is employed for delivery only. In this arrangement the Pilgrim-type component receives gravity-fed oil and, trapping small " slugs " of the lubricant in a rotating and reciprocating piston, delivers it at pressure via a non-return ball valve to the timing-side shaft and big-end bearing. The piston works on the long-established Pilgrim principle and its stroke, and therefore rate of delivery, can be varied by means of an external control knob. Wear in the piston housing, or end cam, results in inefficient working; such faults may also show up in partial, or entire flooding of the glass-covered inspection well.

(*Continued on page* 539)

#### USEFUL DATA

**FINE-LIMIT DIMENSIONS**

**Connecting Rod :** Big-end eye : 1.4681/1.4679 in. Small-end : .6255/.6250 in.

**Tappet Guides (2 off)** Bore .3135/.3125 in. O/D .5616/.5610 in.

**Cam-pinion Shafts :** .5009/.5006 in.

**Cam-pinion Bushes (4 off)** Bore .503/.502 in. O/D .688/.687 in.

**Gudgeon Pin :** O/D .6248/.6245 in.

**MAIN BEARINGS**

**Drive Side :** Hoffman MS9 type, Bore ⅜ in. by O/D 2¼ in. by 11/16 in. wide.

**Timing Side :** Bush : Bore .8755/.8745 in. O/D 1.1255/1.1245 in with .002 taper.

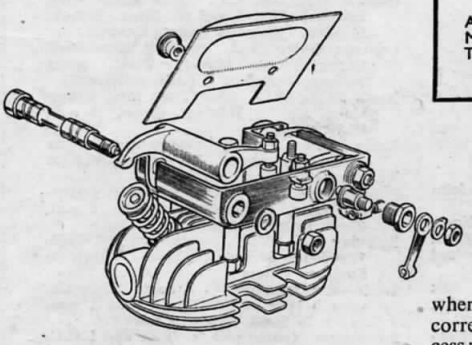
**Oil Retaining Washer :** (On drive side) Bore .878 in. O/D 1.1770 in. dished 1/32 in.

**VALVE TIMING** (all models)

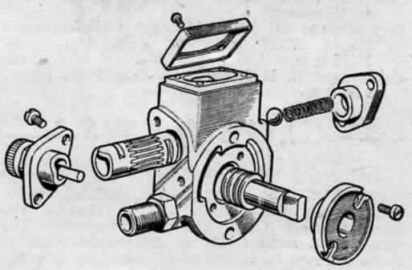
Inlet opens before T.D.C. 20°.
Inlet closes after B.D.C. 50°.
Exhaust opens before B.D.C. 50°.
Exhaust closes after T D.C. 20°.

**CARBURATION**

| | 149 c.c. | 249 c.c. s.v., | 249 c.c. o.h.v. |
|---|---|---|---|
| Amal Type | 93/001 | 74/012 | 74/012 |
| Main Jet | 45 | 70 | 75 |
| Throttle Slide | 3 | 4/4 | 4/4 |



(*Left*). *This simple o.h.v. rocker mechanism relies for its efficient working on grease-gun lubrication.*



*The Pilgrim-type oil pump used on the total loss wet sump* 149 *c.c. and* 249 *c.c.* 1934-5 *B.S.A. models. An extension from the Maglita driving sprocket keys with the square-ended pump-shaft.*

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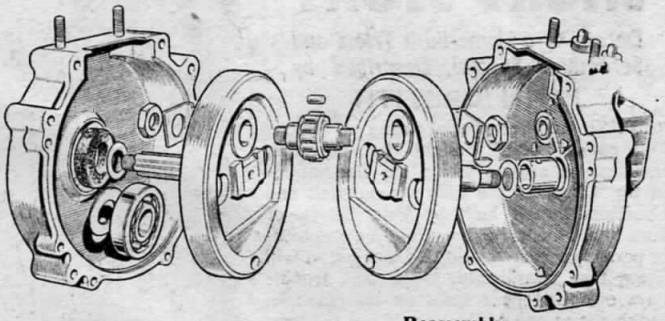
Note that on these engines the crankcase mouth is partly covered, allowing room only for the connecting rod to move up and down. This screening minimizes the risk of plug trouble due to over-oiling, for cylinder lubrication is effected by means of the splash system; clearly a surfeit of oil flung up by the spinning flywheels would readily percolate into the combustion chamber so soon as normal piston-ring wear widened the gaps. The makers recommended oil of the XL or XXL type, which is equivalent to modern S.A.E.30 or 40 ratings, which can be obtained nowadays in almost every well-known brand from most well-stocked garages or filling stations.

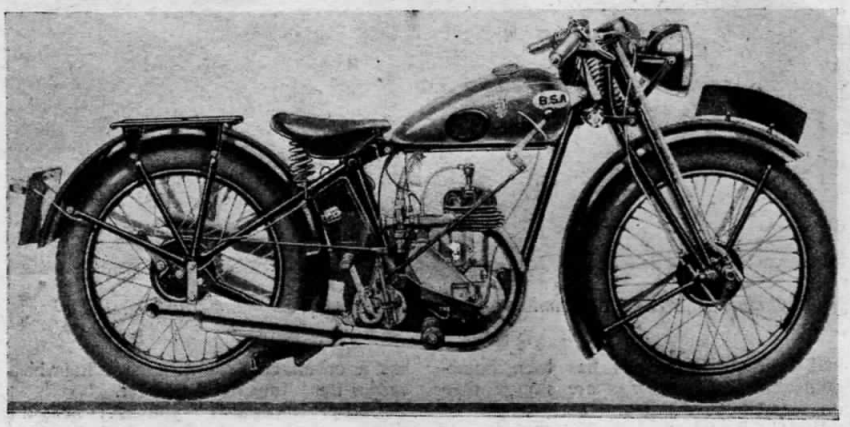


*Crankcase details applicable to the 149 c.c. o.h.v. engine and to both 249 c.c. o.h.v. and s.v. units.*

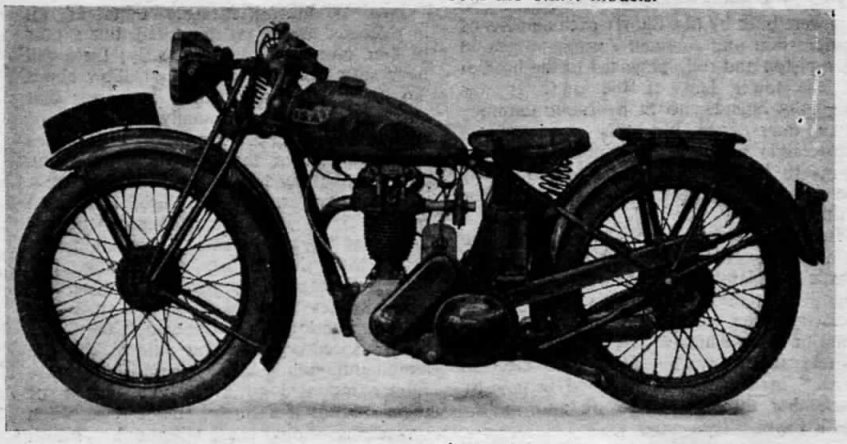
**Reassembly**

Parallel-fit shafts and crankpins are used on the three models; the shafts are pressed in at the works and the amateur seldom possesses equipment for this work. He can deal with crankpin-fitting, however, which is straightforward. Note the use of tab-washers to lock the two nuts once the job is completed and the flywheels finally balanced. The whole assembly is locked up from the drive side and, if the thrust and dished washers have been fitted, the correct amount of end-play—a few " thou." only—is thus assured.

Top-end assembly is conventional. Although there is no oil-flow down the push-rod tubes, they are sealed top and bottom by composition rings and, as new spares are not widely available, the originals must be preserved carefully. A paper cylinder-base washer is fitted and there is a cylinder-head gasket of C. and A. material specified for both the o.h.v. models.

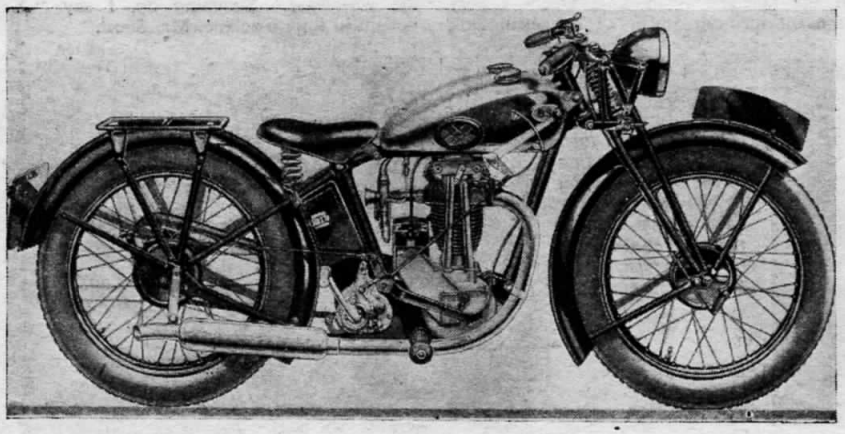


*Above is the 249 c.c. Model B35/1 (the 1935 version of the previous season's B34/1)—a lusty little side-valve with a capacity for hard work.*



*(Right) The 149 c.c. o.h.v. Model X34/0 which cost only £29 17s. 6d. twenty years ago. A utility machine, it had a remarkable performance.*

*Below is seen the 1935 249 c.c. o.h.v. Model B35/2, the general specification of which was similar to its s.v. contemporary.*



**SPARES FOR B.S.A.s**

AN entirely new B.S.A. spares catalogue covering both the C10L and C11G 250 c.c. s.v. and 250 c.c. o.h.v. models, is now available. In the same form as the lists already published for the " A," " B," " D " and " M " groups, with a liberal number of exploded drawings, this publication is obtainable from B.S.A. dealers or direct from the Service Department, Montgomery Street, Birmingham, 11, price 5s. plus 6d. postage.

**FOR LADIES AS WELL**

WE are informed by The Belstaff Manufacturing Co., Ltd., Longton, Stoke-on-Trent that, in addition to the men's motorcycle clothing which is displayed on advertisement page 5 in this issue, ladies' coats can be supplied in all styles and sizes at the same prices.

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SERVICE SERIES OF 1954 — No. 13

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## Overhauling the 1934-5 Model X34-0 and B34-1/2

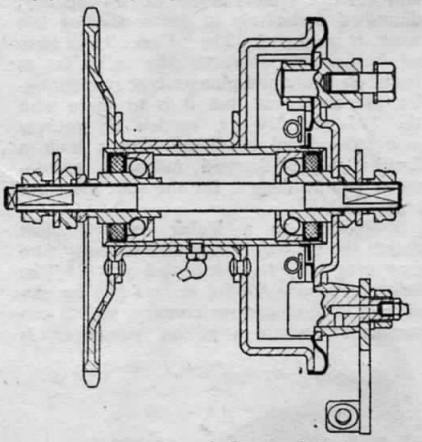
# B. S. A.s

### Part 2—Reconditioning the Gearbox and Cycle Parts of a Popular 149 c.c. Machine with Reference to Corresponding 249 c.c. o.h.v. and s.v. models

WRITING about the gearbox of models popular some 20 years ago, and later dropped by the manufacturers in favour of a new series, is a job full of pitfalls; in this case the snags are multiplied by reason of there being a complete dearth of spares available for my artist colleague to draw! As has happened previously on these jobs, an illustrator's skill with a faded photograph and a blue print has conjured up the accompanying drawing.

Certainly this gear cluster gives some idea of the order of assembly. It will help the unhappy chap who—as so many do—has bought a job lot of bits and pieces in a box and seeks information on how best to put them together.

Despite the difficulty over spares, B.S.A.s, as usual, have rallied round with a great many vital dimensions and the jig-saw is sufficiently complete to be of some value. Items most likely to need attention are the two main gearbox bushes; one supports the mainshaft at the kickstarter end while the other carries the K.S. spindle, which itself is counter-bored to form a bush for the free end of the layshaft. At the drive-end the layshaft is locked up and is, in fact, simply a stationary axle for the pinions.



*A section through the rear hub showing the location of the cup-and-cone ball bearings. There should be just perceptible side play at the rim when hub adjustment is complete.*

This arrangement, it may be remembered, was dealt with in connection with the B.S.A. C10 gearbox on June 10; reference to *Motor Cycling's* issue of that date may help to elucidate the general layout.

An approach can be made by dismantling the clutch, which involves taking down the protective cover, relieving spring pressure by slackening the big centre nut, drawing off the outer plate and centre sprocket member which runs on a single-row ball bearing. The friction medium is provided by two Ferodo rings, located radially. Obviously the drill is to see that the rings are in good condition and that the six pressure springs are up to the job. It is not improbable that Ferodos can still supply a suitable type of clutch ring, while " tired " springs might well be replaced by those of similar pattern from a later B.S.A. model. Albion clutches have employed a variety of springs of this type over the years and it should not be impossible to improvise in this way.

The clutch body is keyed on the mainshaft and, behind it, secured normally by a big nut is the final-drive sprocket splined on the sleeve gear. It helps to slacken this assembly while the gears are still in the box and offering resistance.

At the opposite end a single cover carries externally the clutch push-rod operating mechanism and simple gear quadrant with notches for a spring-loaded selector plunger. Early models had this arrangement, and a gear lever and spindle operating the internal selector-shaft pinion. Later machines were fitted with a short gear lever mounted on the tank and rod linkage down to the box.

Ragged gear-change methods and lack of lubricant, tended to wear out the two bushes carrying the selector shaft. The one at the clutch side (Part No. K32) has a bore dimension of slightly more than ½-in.; it is pressed in to a hole .690/.689 in. in diameter and has a head thickness of .127/.125 in. (about ⅛-in.) protruding. On the K.S. side the shaft is supported by a bush with a bore of 7/16 in. and an O/D of ⅝ in.

The previously-mentioned spindle, running through from the external gear lever, or linkage, to the final gear control quadrant, is bushed. This bush, too, will show signs of wear; oil leakage and bad gear selection is a symptom. The bush is not difficult to turn up if the following dimensions are noted: bore, .563/.563 in.; O/D, .7525/.7515 in.; overall length, 1.062/1.060 in. and the B.S.A. part number is 27/4242.

Removal of the K.S. end-cover gives access to the mainshaft pinions, the sleeve gear and shaft which may be withdrawn, but the layshaft will not come away until the locknut, located externally beneath the bearing boss housing, has been slackened. The single ball journal bearing (a Hoffmann L811 type will suit) is easily jarred out after the surrounding metal has been heated.

Two more important bushes which may need renewing are those in the layshaft pinions which bear on the stationary shaft. They are identical, with a bore of .563/.562 in. and an O/D of .7525/.7515 in. Because of their function they must be line-reamed on assembly to that bore size. Failure to do so will result in difficulty in assembly, stiffness, rapidly worn pinion teeth and noisy transmission.

#### Reassembly

There being no positive-stop mechanism to consider, reassembly resolves itself into practically a reversal of the dismantling process. Take care to put up everything as carefully as possible for, so long as the gearbox will work at all, it will do so better if the assembly is as near as right as possible. The clutch operating lever has a nice degree of adjustment, with knurled locking rings for the cable adjuster in the gearbox casting. A hardened-steel ball impinges on the clutch-operating push-rod: this mechanism works in the open and dust and grit accelerates wear unless the point of contact is kept clean and lubricated regularly with a little thin oil. Surplus lubricant should be wiped away to minimize the risk of further dust accumulation.

#### Lubrication

Use of Mobilgrease No. 2 or Castrol "2D" is recommended in the B.S.A. instructional book. Shell gear-oil also features in the instruction book and probably a compromise in the form of a light grease with

(*Continued on page* 564)

**USEFUL DATA**

**Main Ball Journal Bearing (Sleeve Bearing)**

Dimensions, bore 1.125 in.
O/D 2.5 in.
Width .625 in.

**Mainshaft Bush (In end-cover)**

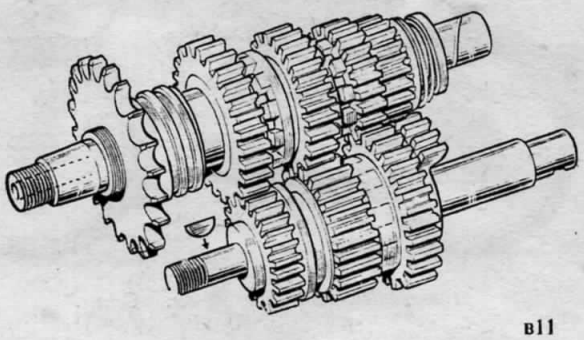
O/D at head: 1.250/1.240 in.
O/D 1.005/ 0005 in.
Bore .752/.751 in.

**Kickstarter Quadrant Bush**

Bore .8125/.8115 in.
O/D 1.0645/1.0635 in.

**Gear Ratios (149 c.c. model)**

| Top | Second | First |
|---|---|---|
| 7 1 | 12.4 | 19.9 |



*The gears are of the constant mesh type and on the right is seen the clusters of pinions on main and layshafts.*