

CARE and MAINTENANCE of a LIGHTWEIGHT

Overhauling
the 1927 Albion Three-
speed Gear.

GEAR BOX

Suggestions
for Simplifying an Ordinary
Rider's Work.



SEVERAL miniature machines are equipped with the Albion "feather-weight" three-speed gear box (notably the Francis-Barnett), and, due to the fact that the gears have quite considerable use if the best is to be obtained from the tiny engines, it pays to keep an eye on the general maintenance of transmission efficiency.

The Albion box of the 1927 type is light for the load it is sometimes called upon to transmit, and although there is little to go wrong internally it must be remembered that some of the gears run at high speeds, that the layshaft runs upon a plain bearing (steel to steel), and that, in consequence, adequate lubrication *must* be maintained. There are ample oil holes and oil ways in the parts which require lubrication, so that all the rider has to do is to keep the box filled up to the level of the filling orifice and to replenish the supply at least every 250 miles.

Grease Unsatisfactory.

Ordinary engine oil is recommended, and in addition to the brand specified on the filler cap, the writer has used Castrol XL, both by itself and in a 50-50 mixture with Crimsangere. A grease alone, however, should on no account be used, as it would not find its way into the plain bearings. Excess of oil will creep out behind the final drive sprocket, lubricating the rear chain; but it will not get to the clutch provided the box is not over-filled.

The gears in general give no trouble, but when new, difficulty in changing may be experienced, the lever being occasionally very stiff to move. This is only due to the locating plunger of the moving quadrant inside the box sticking, and it can be relieved at once by unscrewing the plunger spring-box from the end cover of the gear and oiling the parts. It is necessary to work the gear control while the plunger box is being screwed back. After a thousand miles or so this trouble will not recur, as the plunger and quadrant will be nicely bedded together.

It must be remembered that the sprocket, when free, runs on a plain bearing. The rubbing speed is high and no provision for lubrication is made; consequently rapid wear of the bronze ring takes place, and bronze dust may be found in the clutch and

By "WHARFEDALE."

on the cork surfaces. The bronze ring should be smeared with graphite grease when possible. Over-tightness of the primary driving chain should be specially guarded against, while, if a long stop has to be made with the engine running, the gear should be slipped into neutral and the clutch lever released. No difficulty presents itself in dismantling the clutch, which

comes apart at once when the three spring retaining studs (and their locking plate) are removed.

When it becomes necessary to dismantle the whole gear box for inspection or renewal of parts, the job can be undertaken without professional help if patience and care be exercised.

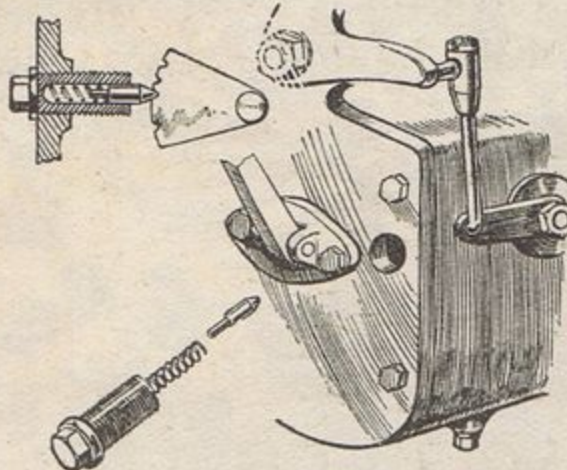
Before removing the box from the machine (or even disconnecting the chains) the kick-starter crank should be removed (procedure as for a pedal cycle crank) and also the clutch operating gear. Naturally, both the cable from the gear box stop abutment and the withdrawal lever and the cap in which it pivots must first be removed, and the push rod from the mainshaft also must be pulled out.

Left-hand Mainshaft Thread.

A nut on the end of the mainshaft is exposed when the clutch-operating lever cap is removed. It should be loosened; be careful to remember that the thread is *left-handed*.

The clutch should be dismantled and the primary chain taken off. A box spanner on the clutch centre nut will loosen it, and if bottom gear is engaged and a friend stands on the brake pedal it will help matters, should the nut be stubborn. Unscrew the nut a turn or so, and then an assistant should pull the clutch back plate away from the machine while the operator strikes, with a heavy hammer, a piece of hard wood or brass resting on the centre nut. This will jar the clutch centre from the shaft, and it can then be removed, taking care, of course, to preserve the key.

The job of dismantling the final drive sprocket can now be tackled. It is secured by a lock ring, which is retained by a lock washer turned down at one point into one of the lock ring notches. Punch up the tongue of the washer and the lock ring can be tapped round with hammer and punch, the assistant again holding the rear wheel by the brake. If the final



Spring plunger for holding the quadrant in the desired position.

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chain is now uncoupled the sprocket can be drawn off its splines. A thin steel packing washer (or washers) is assembled behind the sprocket, and the former requires careful handling.

If no frame parts are in the way the gear lever need not be removed, and after all the screws of the gear box end cover are loosened the whole box can be dropped by undoing the two hanger bolt nuts at the top. By undoing the drain plug all oil can be run out, and it will make matters easier if the plug is now replaced, and the box is half filled with paraffin, shaken up, and drained again.

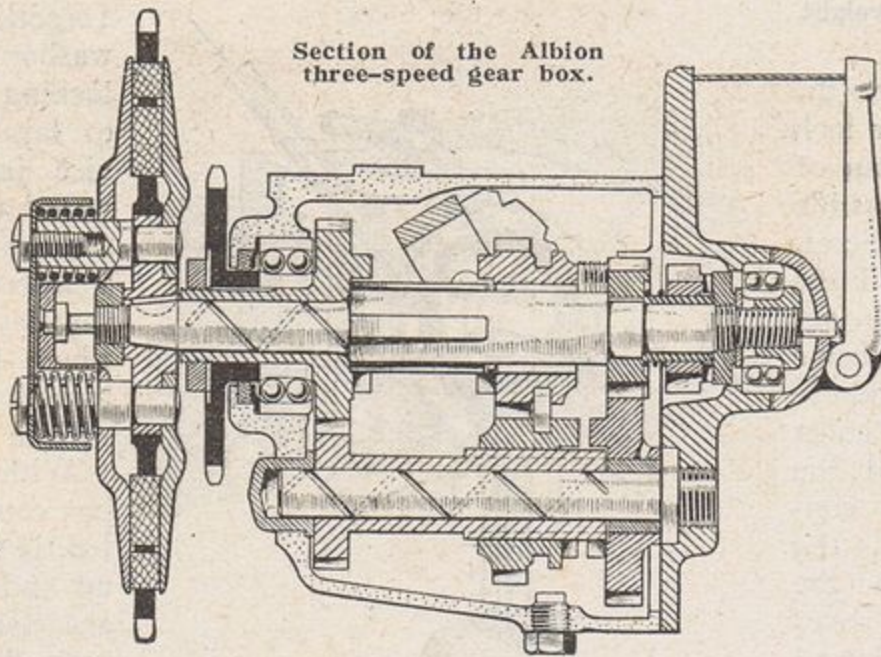
Force Inadvisable.

If the end plate screws and the locating plunger spring box are now withdrawn, the end cover can be taken off. Should it stick do *not* force a screw-driver into the joint, but hold the box by the gear-control bracket and gently tap the end of the kick-start shaft with a hammer. When the end cover is about a quarter inch opened, look inside behind the kick-starter and unhook the kick-start spring from the quadrant, using a thin screw-driver, when the whole end plate can be withdrawn; it will bring with it the kick-start spindle and quadrant and the layshaft fixed spindle. The whole internal mechanism will then "fall to pieces" if the mainshaft is pulled out, leaving inside the box only the gear inside operator and the main sleeve gear. The latter cannot be withdrawn unless the former is taken out, and the best way to do this is to secure the box (not too forcefully) in the vice, and to unscrew the front bush and rear locating peg of the gear inside operator, when the latter can be wangled out sideways, and the main sleeve cog can be dropped out (or tapped through if it is tight in the ball bearing).

Should the main ball bearing be worn or loose in its housing the case should be sent to the makers. Other renewals will depend upon inspection, the points to look for being worn or chipped gear or dog teeth, chipped splines on the shafts, and wear in the bronze bush of the low gear wheel on the layshaft. The kick-starter teeth and ratchets should also be inspected.

After cleaning, inspecting, and obtaining any new parts required, there is the task of re-assembling. The main-sleeve cog and gear inside operator can be put back, and then comes to the careless dismantler or the bemused novice a job which looks like a Chinese puzzle.

Section of the Albion three-speed gear box.



First, two essential points must be noted: (1) The double fork which is controlled by the inside operator goes into the box with its flat (not hollow) side towards the open end and its longest peg or pivot towards the front, and (2) of the two middle gear pinions the one that lives on the mainshaft is the one that has both the dogs and the teeth at one end (whereas the layshaft wheel has its dogs and teeth separated by the groove for the fork). If only these points are appreciated, no

difficulty should be experienced.

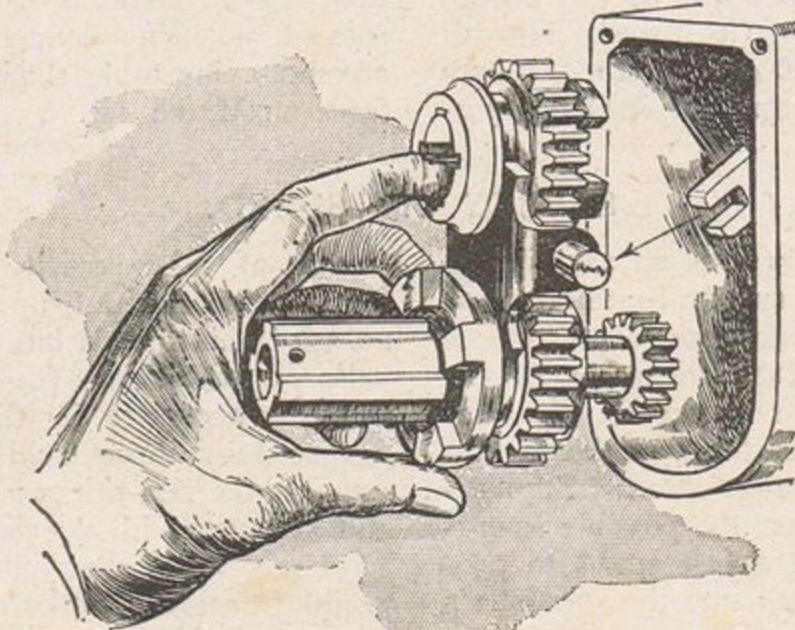
To assemble these parts, then, place the appropriate middle gear pinion on the layshaft sleeve, put the fork the correct way in the groove, and drop the mainshaft middle gear wheel into the fork. Hold the whole assembly together (see sketch) and insert in the box at an angle so that the pins on the fork engage in the slotted ends of the inside operator, which must be turned as far as possible to the low gear position; then the whole assembly is pushed down into the box and the mainshaft is dropped through the middle gear and sleeve pinion.

Replacing End Plate.

At this point the box should be held (but not squeezed) in a vice. The low gear layshaft wheel may be located on the end of the layshaft sleeve, and care must be taken not to disturb the general arrangement too much.

Next, the end plate can be put on. The layshaft spindle is carefully passed down through the sleeve, but while half-an-inch of space remains the kick-start quadrant should be pushed clear of its stop and turned anti-clockwise (using a thin spanner on the pedal cotter flat), and its leading edge engaged with the hook of the spring. It should now be turned another half revolution before pressing the end cover down further, still holding the spanner so that the back edge of the quadrant will keep to its correct side.

A little wangling and shaking may have to be done here, because the layshaft low gear wheel has to enter its bush, the layshaft spindle has to enter its bush at the far side of the box, the mainshaft has to get through its ball bearing in the cover, and so on. By working the spanner on the kick-start spindle like a kick-starter, the "works" can be revolved, and not only will this help matters, but it will enable the assembler to note (1) that the kick-starter works, (2) that the kick-start spring is under tension, and (3) that the starter returns to its stop.



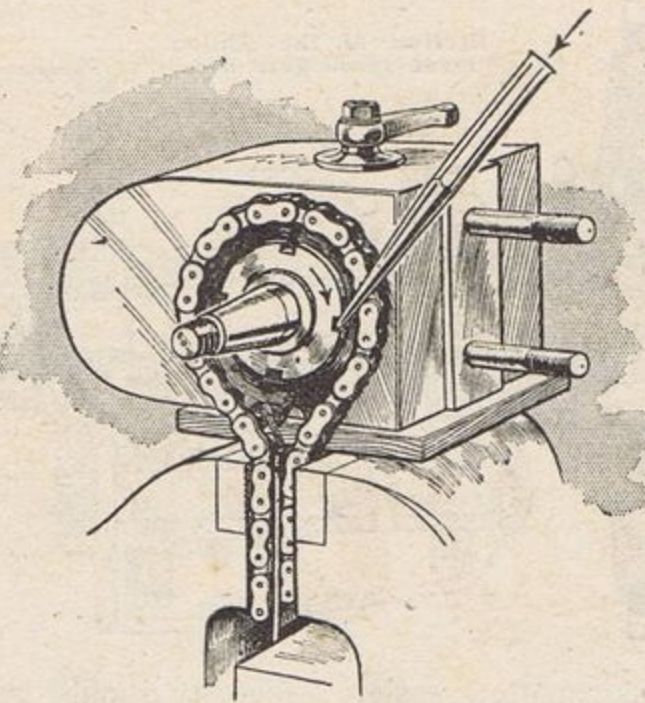
How the two middle-gear pinions, the double-operating fork, and the hollow layshaft are held together when the gears are being reassembled.

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When all these things happen the end cover may still be a quarter inch from bedding down. Insert four of the cover screws as nearly as possible at four opposite corners. Screw them up *finger tight only*, until the heads rest on the cover. *Do not* force the cover on by screwing home the studs; they are merely to relieve the assembler from holding the cover down. By patient turning of the kick-starter, operating the gear control, and turning the shafts, the operator will gradually drop the gears into place, and as the end cover closes it can be gradually followed up by the studs. Screwing the left-hand nut to the mainshaft will also help matters.

When the end cover is home, the rest is merely a case of replacing all external parts in the order in which they were taken down.

The final drive sprocket is best fitted on the bench, not



Method of holding the sprocket while the lock ring is tightened.

forgetting its thin steel packing washer at the back. To secure the locking ring firmly the best way is to lay the gear box flat across the vice jaws with a length of chain round the sprocket; if both ends of the chain are gripped in the vice the sprocket will be held rigidly and the ring can be punched round until tight, when the locking washer can be turned down into one of its notches with a small chisel.

Without the clutch centre the gear box can be put back on the machine, for, if the final chain drive is coupled up and low gear engaged, an assistant standing on the brake holds the gear shafts and gives the operator something to hammer against when tightening up the clutch centre nut.

A generous filling of oil now completes the work; it is the last but by no means least important item. Before running under load let the engine tick over some time so that the oil can circulate to the gears and shafts.

NEW LICENSING CONCESSION EXPLAINED.

ERRONEOUS information which has appeared in the lay Press has caused many riders to be misled as to the concession resulting from the new licensing scheme.

It was due to the efforts of the motor cycle department of the R.A.C. and the Manufacturers' Union that the Ministry of Transport was prevailed upon to make the change, and though the concession is not all that was originally asked for; it certainly is of considerable value to many motor cyclists.

Briefly, the facts are as follows: Motor cyclists may license their machines from the first day of any month between February and September (inclusive), but all such licences *must run to the end of the year*. There is a minimum period of four months, but it is not pos-

	Under 200 lb.		Over 200 lb.	
	Solo.	Sidecar.	Solo.	Sidecar.
From March 1st	£ s. d. 1 6 3	£ s. d. 2 3 9	£ s. d. 2 12 6	£ s. d. 3 10 0
„ April 1st	1 3 8	1 19 5	2 7 3	3 3 0
„ May 1st	1 1 0	1 15 0	2 2 0	2 16 0
„ June 1st	18 5	1 10 8	1 16 9	2 9 0
„ July 1st	15 9	1 6 3	1 11 6	2 2 0
„ August 1st	13 2	1 1 11	1 6 3	1 15 0
„ September 1st	10 6	17 6	1 1 0	1 8 0

sible to take out a licence from, say, April 1st to July 30th.

The amount of money to be paid for a licence under the new scheme is calculated *pro rata*, plus a surcharge of five per cent. Hitherto, of course, it has only been

possible to take out a licence for one, two, or three quarters, or one year, the short period licences being granted at a proportionate rate plus ten per cent.

Quarterly licences are still available at the old rates, and it is still possible to surrender one of these, or a yearly licence, and claim a rebate on the unexpired portion. The rebate is calculated *pro rata*, the standard sum of 5s. being deducted for the work involved. The accompanying table shows the new fees which came into force on March 1st.

SAFETY IN SPEED.

TO the slow and cautious riders it is an astonishing thing how rarely their more speedy brethren come to grief. Yet speed often makes for safety.

Of two riders—one habitually fast, the other slow—the former is invariably the more expert of the two.

The whole reasoning pivots about the fact that a fast pace, of necessity, makes for an alert mind. Suppositions as to what lay round the corner, the possible emerging of traffic from a by-road, the safest speed to take that treacherous bend—all these flash into the speedster's brain and find a ready answer.

It is entirely fallacious reasoning that there is safety only in a crawling pace. In that it gives the rider a

feeling of false security it can be a real danger. The fact that he can pull up in the matter of a few yards is no use if his foot is late in coming to the brake.

Speed, too, makes for courage and nerve, and how far these are necessary for the "complete" rider is best appreciated by those lacking them. Usually they figure amongst the non-riders. Courage to stick tight in a skid and attempt, with nonchalance, to correct it; courage to accelerate out of that tight corner when the more cautious would frantically brake and come a cropper; courage to take that bit of greasy camber without the usual premonitory wobble that invites a crash—all these are the attributes solely of the speedman.

T. H. S.