

Brough Superior

**"THE ROLLS ROYCE
OF MOTOR CYCLES,"**

—Vide "The Motor Cycle."

**INSTRUCTION
BOOK**

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Brough **Superior**

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INSTRUCTION BOOK

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Foreword.

I appreciate that the great majority of "Brough Superior" riders are experienced Motor-cyclists, therefore this booklet is by no means comprehensive, but is only intended to enlighten the rider on certain adjustments and hints peculiar to "Brough Superior" motor-cycles. I take a particular pride in my After Sales Service, and am always pleased to hear from riders of my machines, therefore, should any further information be required than is contained in this book, do not hesitate to write to me direct.

In all correspondence, please make a particular note to include

ENGINE AND FRAME NUMBERS AND YEAR OF MACHINE.

The Engine number will be found stamped on the top of the Timing Chest or on Driving side of Crank Case, and the Frame number on the front of Headling near the bottom.

The above is particularly important when spare parts are ordered, and wherever possible I advise that pattern parts also be sent along.

C. H. L. 729.

Engine No. B.3.14

Frame No. M.9

990 cc

George H. L.

WARNING.

Under no circumstance whatever, must this machine be driven at a speed exceeding **35 m.p.h.** for the first 1,500 miles, and before opening out the machine the cylinders should be removed and pistons examined.

"DON'T'S" IN DRIVING.

- DO NOT** race the engine unnecessarily, or let the clutch in suddenly suddenly to cause the wheel to spin. Take a pride in a silent, smooth gearway.
- DO NOT** use the brakes with violence. Brake early and drive on the throttle instead of the brakes.
- DO NOT** allow engine to labour on high gear on a steep grade, and remember that an extra, faster, and better ascent can be made on the next lower gear.
- DO NOT** under any circumstances, allow the chains to run very slack or very dry. Either will soon cause trouble, and adjustments are easy. Slack chains will inevitably cause hardness of transmission.
- DO NOT** race engine or drive above a maximum speed of 25 m.p.h. for the first 1,500 miles. Mention is made of this warning on account of the natural desire of a new owner to ascertain his motor's maximum capabilities. However, until all bearings are well run in, etc., it is advisable to refrain from speed bursts and the accompanying possibility of seized bearings, piston rings, etc. The first 1,500 miles of an engine's existence is the more important than the next 5,000.
- DO NOT** race the engine in neutral gear position, violently accelerate from a standstill, or drive at full speed on full throttle, etc., when in a residential district. Any motor cycle (or, for that matter, any motor vehicle) when so driven creates abnormal noise, and in the interests of all motorists I earnestly implore every motor cycle owner to studiously refrain from any of the practices enumerated, or any calculated to cause annoyance to the public in general. Recollect that the degree of silence of your cycle is judged, not by the actual noise it is making, but by comparison with other motor cycles. For example, in a busy street your cycle might be inaudible, while in a quiet, narrow street, of high buildings, it might be heard for several hundred yards, although in each case being driven in exactly the same manner.

ENGINE.

Proper lubrication is of vital importance, and the use of only the best lubricant will be repaid many times over by long wear and good service. After extensive tests we have decided to recommend Spherulac Stone Road as the most suitable oil, and advise all owners to use this. As an additional precaution it is advisable to buy from the trusted oilmen or from sealed tins. See where your oil is drawn from.

Oil is carried in the tank underneath the saddle, and the level of oil in the tank should never be allowed to fall below half-full. The integral oil pump is of the single plunger double-chamber type, the larger diameter being used for recharging the crankcase sump, and the smaller end for delivering oil to all the essential parts of the engine interior, from whence it drains into the sump to be returned to the tank. Provision is made on all models to observe the oil in circulation, and a practice should be made of checking the operation of the oiling system before each run, and the oil circulation can be seen at a glance by raising the oil tank filler cap.

The returning oil may be observed running from the small spout immediately underneath the filler cap. This check should be made preferably upon starting up the engine from rest, as, owing to the fact that when stationary, oil from all parts of the engine interior drains back into the sump, and until the surplus is cleared the return is very positive, whereas normally it is somewhat spasmodic and mixed with air bubbles, due partly to the fact that the return oil plunger has a greater pumping capacity than the delivering fresh oil, and partly in the variations in the amount of oil in response to the crankcase, according to engine speed. For example, upon a sudden acceleration the return flow may cease entirely for a time, only, of course, to resume at a greater rate than normal upon deceleration. No provision is made for manual adjustment of the oil supply, the correct delivery to each part of the engine being arranged internally by suitably dimensioned passages. It might here be explained that oil is forced direct to the timing gear chamber, which, after filling same on a predetermined level, overflows into the overhead chamber, and so drains away to the sump. Oil is also forced into the timing gear side hydraulic axle bearing, and thence through a drilled passage in the flywheel to the big end bearing, the splash from which passes up into the cylinder

intention. In addition to this splash, the cylinders receive oil via a direct oil passage, which insures a very adequate supply under all conditions for those, the most vital part of the engine. No attention to this oiling system is required other than checking the return of oil to the tank prior to a run, and the continued replenishment of the supply tank, the level of oil in which, as mentioned above, must be at least half-full, and must not be filled when engine is cold to a level higher than one inch below the return pipe outlet.

Keep the small vent holes in petrol and oil tank filler caps quite clear to prevent air lock. Add an egg-cup-full of oil to each tank of petrol, particularly while the machine is new.

NOTES ON THE OILING SYSTEM.

If the engine is for any reason dismantled, the crankcase must not on any account be separated until the pump plunger has been withdrawn. To withdraw this plunger, first remove both end caps, and also the guide screw, when the plunger can be pushed out, large end first. When re-assembling, the plunger must be inserted after the crankcase sections have been locked together, and before refitting the end caps, the guide screw must be replaced with its relief by engaging the profiled cross groove in the plunger. By moving the plunger in and its while this screw is being introduced, the correct location of the groove can be easily felt, and the screw in position, must be finally firmly screwed home. The entire oiling system is simplicity itself, only one moving part being employed, viz., the double diameter plunger. This plunger is rotated by the engine shaft, and moves backward and forward while rotating, under the influence of the small guide screw which engages with the profiled smaller groove cut in the plunger end. As the plunger moves in its housing in one direction, the large end draws oil from the sump, while at the same time the smaller end is delivering fresh oil to the various channels provided. Upon the reverse movement of the plunger the large end returns to the tank the oil already drawn from the sump, while the smaller end draws a fresh charge of oil from the tank in readiness for delivery to the engine upon the following movement of the plunger. This action, of course, goes on all the while the engine is revolving, and since the exhaust end of the plunger is the large, the engine sump is always kept clear of oil,

leaves the tank "dry pump." At the same time a large quantity of clean, cool oil is being forced under pressure to all working parts. An efficient system of filtering the oil is provided in the oil tank. This consists of a readily detachable felt cartridge through which the returning oil is compelled to pass before emerging from the spout immediately underneath the tank filler cap. This cartridge filter can be removed upon unscrewing the hexagonally-headed cap on the end of the oil tank. The filter should be removed and carefully washed in clean petrol once every 500 miles, while once each season or not less frequently than once every 2,000 miles, the entire tank should be cleaned, thoroughly washed out with petrol, and, after refitting, filled to correct level with fresh, clean oil. To avoid undue waste it is quite permissible to average for this clean-out when the oil is at the lowest recommended level, although it must be pointed out that normally it is highly desirable to add fresh oil frequently in small quantities in preference to allowing the supply to become almost exhausted before refilling, the reason for this being that the more oil there is in the tank, the cooler it will keep in circulation.

Special Warning.

A dirty or choked oil filter cartridge will inevitably cause heavy oil consumption. If thoroughly soaking and washing in petrol does not effect a cure, fit a new cartridge (price 2s. 6d.).

CHAINS.

The primary chain runs to all, and needs very little attention, other than occasional adjustment, and the oil kept up to the correct level in the case (justly level weekly). The oil level plug is positioned near the bottom to prevent overfilling. The rear chain should be removed every 1,000 to 2,000 miles in summer, and every 1,000 miles during winter, and thoroughly washed in paraffin. After carefully wiping it should then be immersed in a bath of motor oil, or, as a poorer substitute, ordinary engine oil. If the latter is used the chain should be laid in soot overnight in order to ensure penetration to all link joints.

GRAB BOX.

Once every 1,000 miles make up contents to level of filling plug with equal quantities of engine oil and Cricmassgon.

CATTLE FORKS.

The most important item is the constant lubrication of the bottom fork link spindles, and check also the rod ends (greasers are provided on all points). Lubricate the long springs running inside the front spring tubes by squirting oil through the side slots. Should play develop in the bottom pins this can be taken up by removing the outside plain washer, and fitting thicker one. Up and down play on these pins can only be remedied by fitting new pins and bushes. Occasionally remove both shock absorbers complete and smear graphite on the shock absorber center body on the fork. Shock absorber adjustment should be such that when forks are pushed down they only slowly return to their normal position by the spring tension.

BOTTOM LINK FORKS.

Constant lubrication to the bottom link spindles is very important to retain the correct action of the fork. To take up play in the center links, loosen all four nuts, slacken shock absorbers right back, turn each spindle a little at a time by means of the square end, in a clock-wise direction; leave a little play as this is usually taken up when the four nuts are tightened.

55-58 Special Type Forks.

See that all the Spindles are well lubricated. To take up side play first slacken off the outside Nuts on the rear side Fork Links, then screw up large Nut on inside of Link. Do not take up play completely as a little is taken up when outside Nuts are tightened. When finished, see that the Forks work freely.

DECARBONISATION.

The period for which an engine will run satisfactorily without being decarbonised, depends to a great extent upon driving conditions. Generally, however, this process should be carried out 1,500 to 2,000 miles first time, afterwards approx. every 1,500 miles. The need for decarbonising will be indicated by a tendency to ping or knock when ascending hills, or upon accelerating also resembling a rattle, and particularly so when the engine is hot. Although to remove carbon deposit it is only necessary to take off the cylinder head, it is advisable to remove the cylinder each 1,000 miles in order to also inspect the piston rings and remove any deposit from the grooves in which they operate and fit new springs if required, and grind in the Valves.

TO DECARBONISE.

First remove sparking plugs to avoid damage and unscrew all the timing bolts for cylinder heads, which latter will then be free to be removed. The carbon deposit should then be scraped off the piston tops and also from the interior of the heads, after which all traces of the deposit should be carefully wiped off with a clean cotton rag, and the heads reflushed. When fixing the cylinder heads care must be taken to see that the gaskets are clean, smear with jointing compound, and before introducing all the bolts the threads should be smeared with Graphite and each be tightened down in turn, in the right order. Then going round each in turn, slightly increase the pressure to each until all are fairly and evenly tightened right home. Lastly, before leaving the job, start up engine, and when warm, go over each bolt again, when it will be found that a slight extra turn will be possible.

TO GRIND IN VALVES.

During each clearance down-coming, it is desirable to remove the valves and grind in to restore the seatings, clean the stems and guides, etc. The most, of course, is done while the head is removed. Having removed the heads and valve inspection covers, gently in turn, force each bottom valve spring cup up with a stout lever, at the same time holding the valve lead down on its seating until it is possible to withdraw the valve stem. Then smear a little grinding paste on the seating and with a screwdriver in the slot in valve head, gently move the valve to and fro (never rotate completely), rubbing the valve off their seatings between each few movements. When the grinding paste comes to life, remove the valve and wipe the seatings clean, and, if necessary, apply another coating of paste and repeat the process. Generally, one application only is sufficient to restore the seatings of other light or exhaust valves, but it may happen that the latter will require a second application to remove all traces of pit marks. Having restored the valve faces, carefully clean off all traces of the grinding paste and thoroughly wipe valve stems and valve guides, when the valves may be replaced, care being taken not to mix their respective positions. Before refitting the valve inspection covers check the tappet clearances, which should be .008 for the inlet and .010 for the exhaust. On the C.H.V. Engines the tappets should be just free to revolve with the up and down play when cold. These clearances should be constantly and accurately main-

desired to obtain the best results as regards silence of valve gear, and a cheap set of engineer's feeler gauges will be found very useful for checking purposes. Once every season or at least every 3,000 miles, both cylinders should be removed in order to thoroughly clean the pistons and rings and the grooves in which they operate. The main and air all parts are perfectly clean before refitting.

TO ADJUST INLET OR EXHAUST TAPPETS.

Hold the body portion of tappet requiring adjustment (bottom large housing) with spanner provided, and slack off nut securing tappet head. Then screw head down or up, as required, until correct clearance is obtained, after which, securely lock in position with lock nut. Always check for correct adjustment after tappet head lock nut has been secured.

TO EXPOSE THE VALVE TIMING GEAR.

Detach outer half of magnets chain cover and remove the nuts securing each of the magnets chain sprockets. Then by means of a suitable lever (a motor car tyre lever will answer) applied to the rear of each sprocket in turn, gently force same off their respective shafts. Next remove the sprocket nuts and screws securing the inner half of magnets chain case which may then be taken away. Now, after removing all the screws securing the timing gear aluminium cover, same may be gently pried off, exposing the timing gear.

Note.—Owing to the fact that normally about one half-pint of oil is contained in the timing gear chamber, a pan or some receptacle should be provided to catch the oil as the cover is being removed. This oil need not necessarily be replaced upon refitting the cover, as immediately the engine is started the oiling system will commence to build up the required level. It is, however, desirable to apply oil generously to any part removed upon its replacement to provide adequate lubrication until such time as the oil level is automatically restored.

TO REMOVE CAM WHEEL.

Having exposed the timing gear as already directed, gently turn the engine until the marks on both cam wheel and small pinion coincide, when raising the front inlet valve by means of a screwdriver or suitable lever, the cam wheel will be free to be withdrawn.

TO REPLACE CAM WHEEL.

Unless help is available to raise the inlet valve as directed, it is necessary to hold same in a raised position by inserting a block of suitable height between the cylinder base and the lower valve spring cap. Then holding all four cam levers up with the fingers gently insert the cam wheel with its marked tooth gap coinciding with the marked tooth of the small pinion. After carefully cleaning the faces of the timing gear case and cover, and ensuring the latter with quick-drying gold size, gently apply the cover with screw holes in correct register, when all lining screws should be thoroughly and evenly tightened down with a good stout screwdriver. After the cover has been fixed, the magnets chain case lock, magnets sprockets and chain may be fitted and magnets refitted as described before.

TO RE-TIME MAGNETS.

Revolve the engine by hand until the lock plates are approximately three-sixteenths of an inch ($\frac{3}{16}$ " for 11-55, $\frac{1}{8}$ " for 85100) from the top of the compression stroke (i.e., the rods upwards immediately after inlet has closed). Then with ignition lever in fully advanced position, and magnets sprocket loose on shaft (the other sprocket having been previously tightened) turn the magnets assembly backwards until the points are just about to break on the No. 1 cam. Holding carefully in this position, tighten up the magnets sprocket nut.

Note.—The operation of re-timing magnets, although requiring care, does not in any way justify the alarm with which many mechanics view it. A good test for correct timing after the foregoing instructions have been carried out, is as follows:—

Start up engine and fully retard ignition. With throttle fully open the engine should run at about 1,500 to 1,600 revolutions per minute, i.e., at about the same speed as 25 to 28 miles per hour. If any considerable variation in this speed is obtained, an alteration in the required direction should be made. When satisfied that magnets timing is correct, securely tighten the nuts which fix magnets sprockets, commencing first with the one on the cam shaft, after which the magnets chain case outer half may be refixed.

TO ADJUST FRONT CHAIN.

To obtain adjustment for the primary chain provision is made to swing the gear box bodily upon its lower fixing bolt.

It will be observed that the upper fixing bolt operates in a slotted hole to permit of the necessary movement. To make adjustment, the gear box fixing bolt on the top of box must first be slackened. Then to tighten the chain adjustment, screw adjuster until the correct chain adjustment is obtained, then retighten the top gear box fixing bolt nut. Correct chain adjustment should allow a whip or movement of $\frac{1}{8}$ in. to $\frac{1}{4}$ in., as the top run of the chain is pressed up and down midway between the sprockets. When finished, screw adjuster clock wise to take up any slack on adjuster and pin.

TO ADJUST REAR CHAIN.

Slack off rear wheel spindle nuts. Then adjust chain as required by means of the bolts which pass through each of the fork ends, after which securely tighten spindle nuts. The correct adjustment (which should allow a whip of $\frac{1}{8}$ in. to $\frac{1}{4}$ in., when chain is pressed up and down) should be obtained for the tightest plain.

Note.—Before tightening rear chain, the adjustment of front chain should be inspected, and if attention to each is required, the latter should be treated first.

Important.—Care is necessary when tightening the rear chain to leave the wheel in correct alignment. When correct, a piece of thin string stretched taut across both wheels, about four inches from and parallel to the ground, should be observed to just touch each tyre at both sides of wheel centre simultaneously. Alternatively, a straight wooden beam about six feet long is a very handy article to be used for the purpose of checking wheel alignment, applied as in the case of string, parallel to, and about four inches from, the ground.

NOTES ON CHAIN ADJUSTMENT.

The tension of all chains should be tried in a number of places, and the adjustment described obtained for the tightest position. When making any adjustment take the opportunity of previously applying lubricant if necessary.

TO ADJUST STEERING HEAD.

The steering head should be occasionally tested for adjustment by exerting pressure upwards from the extreme tips of the handlebars.

Important.—To guard against accidentally over-tightening the head bearings, the effect of which is extremely difficult steering, it is advisable to put up the front of the machine (a bar of suitable height under the crankcase will serve) in order that all chains may be taken up satisfactorily and the steering head left perfectly free. (Caution.) Tighten up the lower of the two Ring Nuts under the handlebar lug, maintain that play has been taken up, then lock up with smaller ring nut.

Bottom Link.—Check off the bolt that goes across the fork girder, also the chain nut that grips the steering column, then tighten down by means of the large hexagon nut. Be sure that all bolts and nuts are tightened down after adjusting. Adjust head on the right side for side-car work.

Steering Head, 5580 Special.

Slacken all the short bolts that grip the Steering Column and screw down large hexagon Nut.

TYRES AND SERVICE.

To obtain satisfactory life and service from the tyres is largely within the user's control, and the first essential to obtain this is proper inflation. The correct amount of pressure is governed substantially by the load to be carried, and it is therefore difficult to lay down a hard and fast ruling. Assuming the weight of driver to be normal, the pressures recommended may be regarded as satisfactory, and we urge all users to make a practice of checking the actual pressure by means of a low-pressure Schindler tyre gauge. This takes a few seconds only, and will amply repay the owner by reason of additional service and economy from follow-on.

The pressures recommended are—

	Front.	Rear.	5/C.
55.80 Side —	21 lb.	19 lb.	
Side-car —	23 lb.	22 lb.	19 lb.
1150 Side —	23 lb.	20 lb.	
Side-car —	25 lb.	22 lb.	19 lb.
55.100 Side —	24 lb.	21 lb.	
Side-car —	26 lb.	24 lb.	19 lb.

FRONT WHEEL AND BRAKE.

To remove front wheel, remove brake cable and knock out spindle, let wheel drop. Should difficulty be experienced in removing brake anchor plate screw in the nut on the opposite side unscrewing, tighten this up dead tight, and hold wheel in vice by means of the large leverage nut on the side opposite to the brake, then place a spacer on the nut on brake side, and tap sharply in an anti-clockwise direction. Remove the front Anchor plate nut, remove the large star washer and set the points so that most tension is put on the plate. When refitting the star washer be sure and see that it fits over the projecting end of floating bush, and is not trapped between the nut and the bush end. Occasionally put a drop of oil on the front brake floating bush, this is situated right in the center of the brake anchor plate. Keep the shaftless arm securing the brake anchor plate to fork (on Castle and Bottom Lock Forks) well lubricated.

REAR WHEEL.

To remove rear wheel take off the detachable portion of the rear suspension, slacken spindle nuts, remove anchor plate bolt, speedometer cable from angle drive, rear brake rod adjuster and chain, and slide wheel out. Check for alignment when refitting. Occasionally check over the three sprockets retaining nuts and put a little oil between the outside retaining ring and sprocket.

SPRING FRAME.

To correctly adjust the spring frame, jack the machine up in the region of the gear box, allowing the rear wheel to stand clear of the ground. To take up play in the stabilizer assembly, slacken off all four rocker bar nuts, also shock absorber nuts, turn spindles by means of the square ends in an anti-clockwise direction. Do not take up play completely as a little is taken up when the end nuts are tightened. Adjust one spindle, tighten up end nuts, and check up and down movement before adjusting the other spindle. Adjust shock absorber nuts equally on both sides so that when rear portion of frame is lifted it will just stay put. Rear fork end shock absorbers may be screwed up dead tight. Main rocker bar through frame requires no adjustment, but regular greasing is essential; grease remainder of spring frame where nipples are provided, once a week.

TWIST GRIPS.

Do not allow the map twist grip to rattle while riding because apart from the lack of performance, it will cause disconnection of exhaust pipes. The twist grip should always be kept on the tight side to prevent the possibility of rattle without the driver noticing it. Should the twist grips work too freely they may be damped slightly by screwing in the small grub screw in the plated ring at the end of the rubber grip.

CONTROLS.

All controls open (or advance) inwards towards the rider. The hinged elastic ring of the left handlebar operates the clipping beam of headlamp.

GENERAL.

Clean out petrol tap, pipes and filter at bottom of carburettor every 1,000 miles whilst machine is comparatively new. Petrol taps are fitted with filters inside the tank.

An hour spent in cleaning and checking over nuts, etc., is time well spent. Take a pride in your machine and it will repay you. Clean and adjust Sparking Plugs every 500 miles. Consult gap in .020.

WHEELS (LUBRICATION OF BEARINGS).

Journal ball bearings are fitted and are non-adjustable. Bearings are packed with grease when originally turned out; it is advisable to repack with grease every 1,000 miles.

CARBURETTER.

This is set before leaving the Works, and should not be interfered with.

S.S. 80 SPECIAL



**The Popular
Choice**