



INSTRUCTION BOOK
for the
Royal Enfield
* Made like a Gun *
1957-58-59-60 "CRUSADER 250"
1958-59-60 "250 CLIPPER" and
1959-60 "CRUSADER SPORTS"
MOTOR CYCLES

700/LM.1060

Printed in England by Hudson & Son Ltd., Birmingham 3

Price 2/-

Royal Enfield

TECHNICAL DATA FOR 1960 MODELS

Engine type	...	...	...
Number of cylinders	...	...	...
Cylinder head	...	...	...
Cubic capacity (c.c.)	...	...	...
Bore and stroke (mm.)	...	...	...
Compression ratio	...	...	...
B.H.P. × R.P.M.	...	...	...
Carburettor	...	...	...
Lighting and charging set	...	...	...
Ignition	...	...	...
Primary drive chain	...	...	...
Final drive chain	...	...	...
Rear suspension	...	...	...
Front fork	...	...	...
Hubs :			
Front	...	...	...
Rear	...	...	...
Gear ratios (solo)	...	...	...
Tyre sizes:			
Front, Dunlop ribbed (ins.)	...	...	...
Rear, Dunlop studded (ins.)	...	...	...
M.P.H. per 1,000 r.p.m. in top gear	...	...	...
Approx. maximum speed (m.p.h.)	...	...	...
Approx. petrol consumption (m.p.g.)	...	...	...
Petrol tank capacity (gallons)	...	...	...
Oil tank capacity (pints)	...	...	...
Brake diameter and width:			
Front (ins.)	...	...	...
Rear (ins.)	...	...	...
Seat height approx. (ins.)	...	...	...
Wheelbase (ins.)	...	...	...
Overall width (ins.)	...	...	...
Ground clearance (ins.)	...	...	...
Weight (lbs.)	...	...	...
Equipment	...	...	...

250 CLIPPER

Four-stroke
1 o.h.v.
Cast iron
248
70 × 64.5
7.5 to 1
13 at 5,750
Amal Monobloc
Lucas A.C. Rectifier
D.C. Coil
$\frac{3}{8}$ " pitch
$\frac{1}{2}$ " pitch
Pivoted fork
hydraulic damping
Telescopic
automatic lubrication
Light alloy full width
Standard
6.14, 8.29, 11.05, 18.0
3.25 × 17
3.25 × 17
11.3
70
100
3
3
6 × 1
6 × 1
29
52
25 $\frac{1}{2}$
5 $\frac{1}{2}$
300
—

CRUSADER 250

Four-stroke
1 o.h.v.
Light alloy*
248
70 × 64.5
8 to 1
13 $\frac{1}{2}$ at 5,750
Amal Monobloc
Lucas A.C. Rectifier
D.C. Coil
$\frac{3}{8}$ " pitch
$\frac{1}{2}$ " pitch
Pivoted fork
hydraulic damping
Telescopic
automatic lubrication
Light alloy full width
Q.D.
6.14, 8.29, 11.05, 18.0
3.25 × 17
3.25 × 17
11.3
70
100
3
3
6 × 1
6 × 1
29
52
25 $\frac{1}{2}$
5 $\frac{1}{2}$
305
Stop light
Air cleaner

CRUSADER SPORTS

Four-stroke
1 o.h.v.
Light alloy
248
70 × 64.5
8.5 to 1
17 at 6,250
Amal Monobloc
Lucas A.C. Rectifier
D.C. Coil
$\frac{3}{8}$ " pitch
$\frac{1}{2}$ " pitch
Pivoted fork
hydraulic damping
Telescopic
automatic lubrication
Light alloy full width
Q.D.
6.14, 8.29, 11.05, 18.0
3.25 × 17
3.25 × 17
11.3
75-80
95
3 $\frac{3}{4}$
3
7 × 1 $\frac{1}{2}$
6 × 1
29
52
26
5 $\frac{1}{2}$
305
Stop light

*Cast iron on Crusader "Airflow"

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★ ★ 'Made like a Gun' ★

1957-58-59-60 "CRUSADER 250"
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1959-60 "CRUSADER SPORTS"
MOTOR CYCLES

THE
ENFIELD CYCLE COMPANY
LIMITED

Head Office and Works :
REDDITCH, WORCESTERSHIRE

Telegrams :
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Royal Enfield

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‘Made like a Gun’

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“Crusader 250,” “250 Clipper” and “Crusader Sports”

- 1 **Foreword.** These 248 c.c. O.H.V. models incorporate the latest advances in modern motor cycle practice. The short-stroke, 70 mm. bore $\times$ 64.5 mm. stroke engine is of unit construction, the four-speed foot-operated gearbox and oil tank being integral with the crankcase. It has dry sump lubrication, completely enclosed, and lubricated valve gear and a very rigid one-piece, high strength cast iron crankshaft. The complete engine and gearbox, except for the crankshaft and connecting rod, can be dismantled without removal from the frame. An A.C. generator enclosed within the off-side crankcase cover supplies current for lights and ignition coil. The ignition switch, coil and battery are grouped together in one box which also has compartments for an air filter and tools. Pivoted fork rear suspension and telescopic front forks provide a high degree of comfort and road holding. The headlamp, speedometer, ammeter and lighting switch are built into the “Casquette” which shrouds the top of the front forks.

Other items are full-width aluminium-alloy quickly detachable rear hub on the two “Crusader” machines, incorporating the Royal Enfield cush drive, full-width aluminium-alloy front hub, 3.25" $\times$ 17" tyres and fully enclosed rear chain.

Legshields and pannier equipment, specially designed to fit this machine, are available as extras.

OPERATION OF THE MOTOR CYCLE

- 2 **Controls.** A rider should familiarise himself with the positions and method of operation of the various controls so that their use becomes automatic. The controls are shown diagrammatically on page 5, and in most cases the method of operation is obvious. The following notes may, however, be of assistance: —

"CRUSADER 250," "250 CLIPPER" AND "CRUSADER SPORTS"

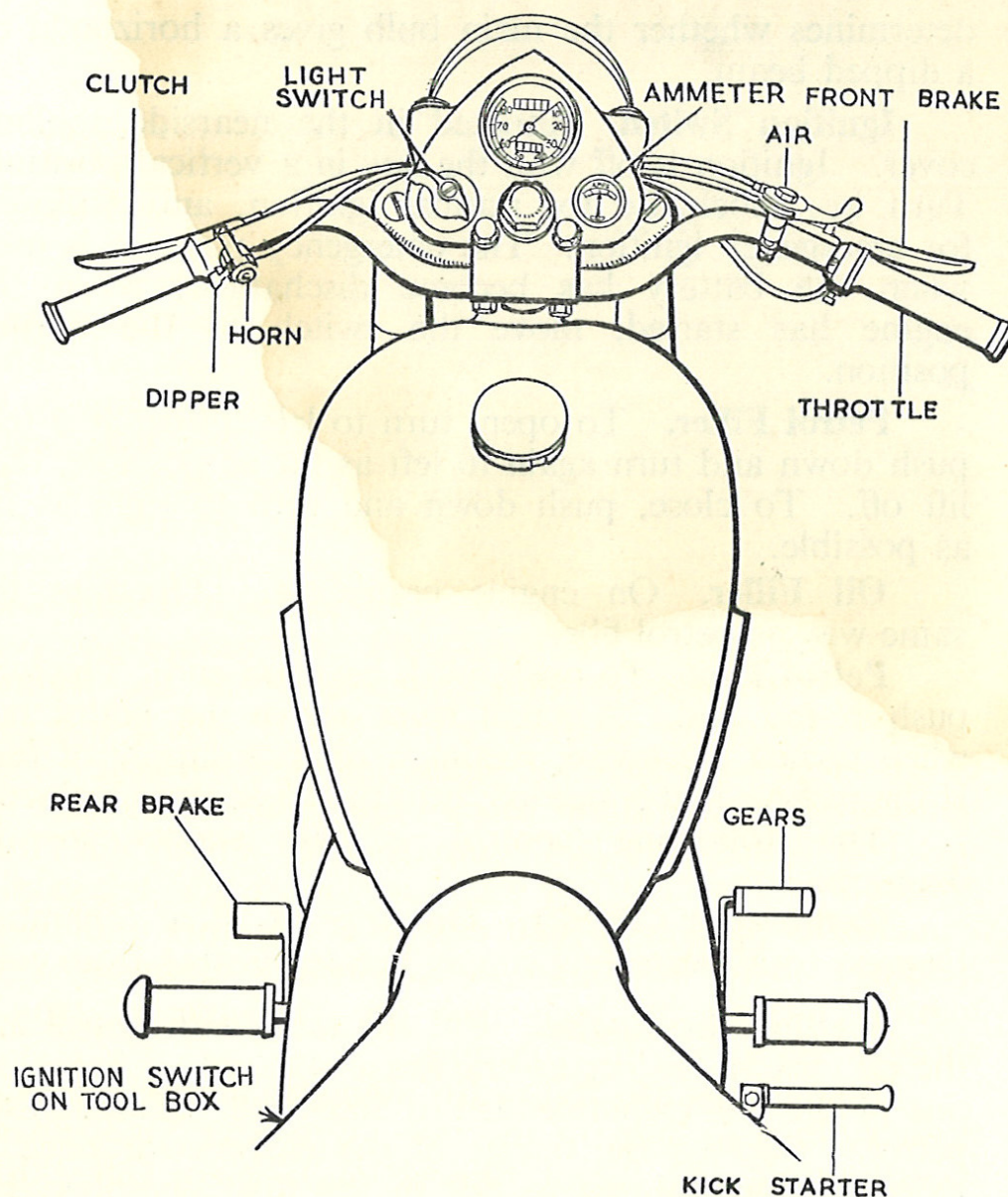


Fig. 1.—Plan of Controls.

Gear Control. Move up for change to a lower gear. Move down for change to a higher gear. A small pointer on the outside of the crankcase cover indicates which gear is engaged, neutral is between first and second gears.

Kickstarter. Operate with a long swinging kick.

Lighting Switch. Position "L" gives headlamp pilot bulb, tail lamp and speedometer light. Position "H" gives headlamp main bulb, tail lamp and speedometer light. A dipper switch on the handlebar

determines whether the main bulb gives a horizontal or a dipped beam.

Ignition Switch. Situated in the nearside toolbox cover. Ignition is off with the key in a vertical position. Turn key clockwise for normal ignition, anti-clockwise for emergency ignition. The emergency position is used when the battery has become discharged; when the engine has started, move the switch to the normal position.

Petrol Filler. To open, turn to left till catch is felt, push down and turn again to left as far as possible, then lift off. To close, push down and turn to right as far as possible.

Oil Filler. On engine crankcase. Operates the same way as petrol filler.

Petrol Tap. To open, push hexagon end. To close, push round end. A small lever above the petrol tap, when turned clockwise, retains a reserve supply of fuel. If the reserve fuel is needed, turn the lever anti-clockwise.

The following control is **not** shown in the diagram:—

Carburettor Tickler. On top of float chamber. Depress to increase fuel supply before starting from cold.

- 3 **Starting the Engine.** Fill the tank with petrol and the oil tank in the engine crankcase with oil. Always use one of the oils recommended in Section 8. Turn on the petrol. Depress the tickler of the carburettor once or twice until petrol can be felt in the float chamber, **but do not flood the carburettor.** Place the gear control in the neutral position, close the air lever, open the throttle control about one-eighth, and smartly depress the kick starter. If the engine fails to fire first or second time, repeat with a slightly different throttle opening. The best position for starting will soon be found from experience. When starting a warm engine, do not flood the carburettor or the mixture will become too rich.

Should any difficulty be found in kicking the engine over, put the machine in gear and gently wheel the machine backwards a few inches until compression can

be felt. Put the gear in neutral then administer a good swinging kick to the starter pedal.

- 4 To Start the Machine.** Pull up the clutch lever. Engage the lowest gear by pressing the foot control up as far as possible and then releasing it. Slowly release the clutch lever, at the same time accelerating the engine by opening the throttle slightly and the machine will move away without jar or jerk. When the machine has attained sufficient speed (about 10 m.p.h.) de-clutch, at the same time closing the throttle and changing to second gear by pressing the foot control downwards as far as it will go and then releasing it. Let in the clutch gradually and open the throttle again until the speed of the machine is sufficient to require a change into third gear (about 20 m.p.h.), when the foregoing operations are repeated. Finally, change up to top gear when sufficient speed has been attained in third (about 30 m.p.h.).

Note. The above speeds are intended only as a rough guide for making a normal get-away on a level road. When starting up a steep hill rather higher speeds should be used in the intermediate gears.

Once top gear is engaged and the machine is running at a comfortable speed, the air lever should be fully opened.

- 5 Driving Hints.** For normal running on the level the air lever can be left fully open, the speed being controlled by the throttle, but when accelerating or climbing a hill it may be necessary, especially while the engine is cold, partly to close the air lever in order to prevent "pinking" or knocking.

Never allow the engine to labour on a hill. If the machine will not climb comfortably in top gear, change down by de-clutching and moving the gear lever upwards as far as possible and then releasing it, leaving the throttle control open during the change. When in the lower gear, the air lever may be opened to suit the higher engine speed. If a hill is long and steep enough to demand a change to a lower gear, it is always desirable to make this change before the engine has commenced

to labour. One change low down may save two higher up and at the same time enable a faster climb to be made.

To stop the machine, close the throttle and apply the brakes; lift the clutch as the machine comes to rest. The engine may be kept running with the clutch out, if the stop is of only short duration, but neutral should be found if the engine is kept running for any length of time. To stop the engine, switch off the ignition. Engines are sent out from the Works with the carburettors set at a tick-over rate. It is, of course, possible to set the throttle stop to close the throttle completely, in which case the engine will stop whenever the throttle is closed.

Note that the positions of the handlebars, footrests and all controls (including the gear lever and the brake pedal) are adjustable. A rider cannot have proper control of his motor cycle unless he is comfortable and the controls are conveniently situated. Riders should set the controls to suit their individual requirements.

- 6 **Running-in.** All Royal Enfield motor cycles have a special oval formed piston which minimises the risk of seizure with a new engine. Nevertheless, careful running-in is highly desirable if the best results are to be obtained.

It is recommended, therefore, that a new machine should not be driven at a speed exceeding 30 m.p.h. for the first 200 miles, and, until at least 500 miles have been covered, the throttle should not be opened above half way, except for very short periods. After this distance short bursts of speed are desirable in order to hasten the bedding down of the thrust faces of the piston. Gradually increase the duration of these speed bursts until the machine will stand large throttle openings for indefinite periods. Note the importance of **progressively** increasing the work done by the engine. Running 1,000 miles at 30 m.p.h. will **not** bed down the piston to enable it to withstand continuous high speed running. Piston temperature is the important factor and this depends not only on speed and throttle opening, but also on how long that particular throttle opening has been sustained. Thus a machine after the preliminary

200 miles might stand full throttle for half a mile and yet pull up if driven at three-quarter throttle for five miles or so.

If the engine is run too long on a large throttle opening and shows the slightest tendency to pull up or seize, **lift the clutch and close the throttle.** Even if a seizure then occurs it will do little or no damage and after cooling for a minute or two the piston will free itself. If a seizure does occur, the piston should be examined by a competent mechanic to have any high spots eased down.

LUBRICATION

- 7 Lubrication of the Engine.** The lubrication is on the dry sump system, incorporating a duplex pump, a large, felt filter and an oil reservoir cast integrally with the crankcase.

The delivery pump supplies oil to the big-end and piston, having first passed it through the felt filter. From the sump, the return pump picks up the oil and returns it to the reservoir, but a by-pass, controlled by a ball valve, leads some of this oil through an external pipe to the rocker gear. From here, oil finds its way down the push rod tubes to the camshaft housing from whence it passes into the primary chaincase and then back into the sump.

8 LUBRICATION ROUTINE FOR THE ENGINE

Never allow the oil tank to become empty. Since there is no reserve of oil in the sump, an empty tank means immediate shortage of oil to the working parts. The oil level should be kept well above the bottom of the dipstick attached to the filler cap. By keeping a large quantity of oil in circulation, its temperature is kept low, and the oil retains its lubricating qualities for long periods. Do not, however, fill the tank above the oil return plug, or oil may escape past the filler cap.

If difficulty is experienced in obtaining the grades recommended for hot climates or summer use, the alternatives for winter use or cold climates can be used. These flow freely when cold and at the same time have adequate

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RECOMMENDED LUBRICANTS

	Castrol	Mobiloil	Esso Extra Motor Oil	B.P. Energol	Shell X-100 Motor Oil
Engine (summer)	XXL	BB	40/50	S.A.E.40	40
Engine (winter)	Castrolite	A	20W/30	S.A.E.30	30
Gearbox	XXL	BB	40/50	S.A.E.40	40
Chains—front	Castrolite	Arctic	20W/30	S.A.E.20	20
rear	XXL	BB	40/50	S.A.E.40	40
Grease Gun	Castrolase (Heavy)	Mobilgrease (No. 4)	Esso Grease	Energol C.3	Retinax A
Front Forks	Castrolite	Arctic	20W/30	S.A.E.20	20

heat-resisting properties. The importance of efficient lubrication cannot be over-estimated. The use of cheap oils is false economy and we strongly recommend the oils mentioned above, as we have found from experience that these are the most suitable for our engines. It is advisable to specify the brand as well as the grade and, as an additional precaution, oil should be bought from branded cabinets or sealed cans.

During the running-in period we recommend the addition of Acheson's Colloidal Graphite to the oil in the engine.

After the first 500 miles and subsequently about every 2,000 miles, the oil should be drained from the tank and engine sump and the felt oil filter cleaned (see Section 9). To drain the tank remove the hexagon-headed plug underneath the nearside of the engine. The small screw on the same side of the engine drains the sump. The tank should be swilled through with clean oil. This procedure is conveniently carried out when the engine is being decarbonised. The oil will flow more readily if the plugs are removed at the conclusion of a ride, alternatively, the tank and sump may be allowed to drain overnight. Waste of oil is reduced by allowing the oil level in the tank to become reasonably low before draining.

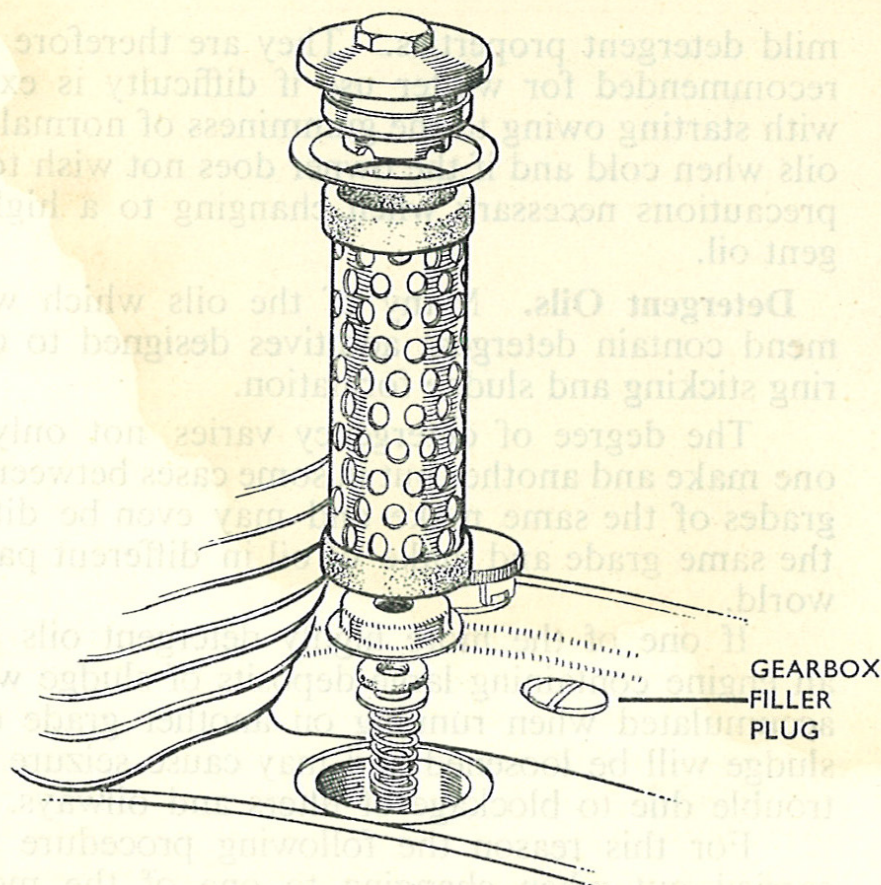


Fig. 2.—Exploded View of Felt Oil Cleaner.

- 9 **Felt Oil Filter.** The construction of this is clearly shown in Fig. 2. The felt filter element should be cleaned by washing in petrol every 2,000 miles and in addition the element should be renewed every 5,000 miles.
- 10 **Multi-grade Oils.** Some of the manufacturers of the lubricants in the table above offer special engine lubricants, the viscosity of which is less sensitive than usual to temperature changes. These are classed as S.A.E. 10W/30 or 10W/40 oils. Their use will facilitate starting at low temperatures but may result in an increase in the rate of oil consumption. These oils are all of a highly detergent nature and the precautions given in paragraph 11 should be followed if a change to them is made after a long period of use on a non-detergent oil.

Castrolite and Esso Extra Motor Oil are of a mild multigrade character (S.A.E. 20W/30) and have only

mild detergent properties. They are therefore especially recommended for winter use if difficulty is experienced with starting owing to the gumminess of normal S.A.E.30 oils when cold and if the owner does not wish to take the precautions necessary when changing to a highly detergent oil.

- 11 Detergent Oils.** Many of the oils which we recommend contain detergent additives designed to counteract ring sticking and sludge formation.

The degree of detergency varies not only between one make and another but in some cases between different grades of the same make and may even be different for the same grade and make of oil in different parts of the world.

If one of the more highly detergent oils is used in an engine containing large deposits of sludge which have accumulated when running on another grade of oil this sludge will be loosened and may cause seizure and other trouble due to blockage of filters and oilways.

For this reason the following procedure should be carried out when changing to one of the more highly detergent oils, particularly if the engine has been used on a normal grade of oil or has not had the oil drained and changed at regular intervals as recommended in Section 8.

- (1) Drain the engine when the oil is hot and refill with detergent oil.
- (2) Run the machine at moderate speed for not more than 50 miles.
- (3) Drain the engine again when the oil is hot, flush out the oil tank with detergent oil, remove, clean and replace filters (preferably fit new felt filter element). Refill with detergent oil.
- (4) When machine has run a further 100 miles, check condition of filters. If clogged, repeat operation (3).

Note. Although the detergent additive in the oil keeps the engine clean and prevents sludge formation, it naturally becomes used up in the process. If an engine

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has a very low oil consumption so that "topping up" is seldom (if ever) necessary, the additive may all become used up, in which case sludge formation will occur at the normal rate. It is therefore just as important to drain the engine at regular intervals with a detergent oil as with one having no detergent additive.

Your dealer will advise you which makes and grades of oil in your country have sufficient detergency to necessitate the above enumerated precautions being taken.

- 12 Lubrication of the Gearbox.** The gearbox should be kept filled to the correct level with engine oil. On no account should heavy yellow grease be used in the gearbox. The filler plug is situated on the top of the crankcase. The screw in the middle of the off-side crankcase cover should be removed and the gearbox filled until oil runs from the screw hole. Wait until the oil stops running before replacing the screw. The gearbox may be drained when desired by removing the hexagon-headed drain plug situated underneath the offside of the crankcase.

- 13 Lubrication of Chains.** The front chain and timing chain are automatically lubricated, the correct quantity of oil being maintained in the chaincase by the oiling system of the engine.

If the front chaincase has been removed for any reason, it should be replenished with about one-third of a pint of engine oil before running the engine, otherwise the chains will not be lubricated until the oiling system has filled the case to the correct level.

The maintenance of the rear chain on the "Crusader 250" is very much simplified by its enclosure in a pressed steel case. Lubricate at frequent intervals with engine oil.

- 14 Grease Gun Lubrication.** The rear brake pedal, gear control and speedometer drive should be greased with a grease gun every 200 miles or once a week.

The rear suspension pivot spindle which has greasers at either end should be lubricated every 500 miles.

Use one of the following greases in the gun: —

Castrolase (Heavy), Shell Retinax A,

***Esso Grease, Energrease C.3 or Mobilgrease (No. 4).**

- 15 Lubrication of the Front Fork.** The oil level in the telescopic front fork is determined by a small screw at the back of each sliding fork leg. Before topping up the forks, first place the machine on the centre stand, thus allowing the forks to extend. To fill each fork leg to the correct level, remove the plug screws from the fork head and the oil screws at the back of the sliding fork leg. Pour oil in at the top until it runs out from the level holes. Wait till oil has stopped running and replace level plugs and plug screws.

Recommended grades of oil are: —

Castrolite : Mobiloil Arctic :

Esso 20W/30 : Shell X-100 20 :

Energol SAE.20.

TROUBLE ON THE ROAD

- 16 Royal Enfield Motor Cycles** enjoy a wonderful reputation for reliability. Trouble on the road is very unusual; nevertheless stoppages may sometimes occur and it is hoped that the following hints may help towards the speedy location of the trouble.
- 17 Engine Stops owing to lack of Petrol.** This is the commonest form of engine stoppage. The first symptoms are irregular firing, which is temporarily cured by closing the air lever. Make sure that there is plenty of petrol in the tank. If so, disconnect the petrol pipe at the carburettor end and turn on the tap. If a good flow of petrol occurs, the stoppage is probably in the jet itself. If the flow from the petrol pipe is restricted, the stoppage lies either in the petrol tap or in the pipe itself.
- 18 Engine Misfires or Stops owing to faulty Ignition.** The symptoms in this case are that the engine will not

* Known as Esso Cup Grease in overseas countries.

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run regularly and is very hard to start. In other cases the engine may suddenly "cut out" without any warning. First see that the high tension lead has not become disconnected at either end and is not worn or burnt through, allowing the bare wire to touch some metal part of the machine. See also that the plug insulator and high tension lead are not wet.

If all the above is in order, remove the sparking plug and hold it with the body touching the engine cylinder, but with the terminal clear of the machine and connected to the high tension lead. Turn the engine round by the kick starter. If a good spark is obtained at the plug points, the ignition is in order and the trouble lies elsewhere. If no spark, or a very weak spark, is obtained, remove the plug and hold the end of the high tension wire about $\frac{1}{8}$ " from a metal part of the machine and rotate the engine. If a spark is obtained from the wire, the fault lies with the sparking plug. If this is oily or sooty it can be taken apart and cleaned, but if the points are red and burnt the plug has been too hot and a new one should be fitted. The gap between the plug points should be .018" to .025".

If the plug is satisfactory, the trouble lies elsewhere. See that the contact breaker points are clean and that they open and close properly. These should open to .014" to .016".

A sticking rocker arm may be another cause of failure, while faulty low tension leads, battery and other connections may all result in stoppage or poor running. Ignition trouble can come, of course, from a faulty condenser or coil.

Failure of the generator to charge the battery may be due to a faulty rectifier or short circuits and a low charge rate can be caused by the connections joining the generator coils making contact with the inside of the crankcase cover.

- 19 Other Causes of Engine Stoppage.** Other possible causes of an engine stoppage are: —

- (1) **Water in Carburettor.** The symptoms are usually intermittent misfiring and banging in the silencer following a heavy rainstorm. The remedy is to clean out the float chamber and jets.
- (2) **No clearance at tappets.** This is apparent by an entire lack of compression when turning over with the kick starter. The remedy is to adjust the tappets.
- (3) **Sticking Valve.** In this case there is no compression and excessive tappet clearance, the valve remaining partly open. The valve may free itself on cooling, but sometimes it is necessary to dismantle the engine to free the valve.
- (4) **Broken Valve.** This trouble is very rare and is usually caused by consistent overdriving of the machine and by neglect of the tappet clearance (see Section 28). The symptoms are that the engine "cuts out" suddenly and stops with no tappet clearance. Furthermore, it is not possible to obtain any clearance at the tappets. A valve breakage on an O.H.V. engine is likely to have very serious consequences.
- (5) **Seized Piston.** This is caused by overdriving a new machine before the engine is properly "run in." The symptoms are loss of power and a tendency to "pink" followed by the engine locking up solid. An aluminium piston will always free itself if allowed to cool. If the clutch was withdrawn and the throttle closed before the final seizure the consequences may not be serious, but the cylinder and piston should be examined as soon as possible by a competent mechanic to have any score marks removed. A seizure may also occur through running with insufficient oil, in which case the consequences will be far more serious.

20 Clutch Trouble. A slipping clutch may be caused by lack of clearance in the control (see Section 39).

A binding clutch is caused by too much slack in the control wire. New clutches sometimes tend to bind until the inserts have bedded down dead level.

OVERHAULING THE ENGINE

- 21 Decarbonising.** When an engine has been in use for some time, carbon deposit forms on the piston and cylinder head and the engine must be partly dismantled to allow this deposit to be scraped off and the valves to be re-ground.

The time when decarbonising becomes necessary will be indicated by an increased tendency to "pink" and will occur after approximately the first 2,000 to 2,500 miles, and subsequently at intervals of about 5,000 miles.

- 22 Removal of Cylinder Head.** Turn off the petrol tap and disconnect the petrol pipe from the tank. After removing the bolt attaching the front of the tank to the frame, the rear of the tank can be pulled upwards, releasing the clip holding it to the top tube of the frame, and the tank lifted clear. Unscrew the central nut securing the rocker box cover, remove the cover and—carefully—the gasket. Detach the oil pipe assembly which leads from the crankcase to the cylinder head. Remove the exhaust pipe, sparking plug and the cylinder head steady. Roll back the rubber connection from the carburettor air intake to the air cleaner and remove the carburettor from the cylinder head. Undo the five cylinder head holding down nuts (four inside the rocker box and one near the sparking plug hole).

Machines having an alloy head have **an extra securing pin in the push rod tunnel.** In addition to removing the five holding down nuts, also undo this pin, which has a hexagon socket head.

Lift the cylinder head about one inch and remove the push rods; the head can now be lifted clear.

- 23 Removal of Cylinder and Piston.** Whilst it is not strictly necessary to remove the cylinder barrel and piston, this should preferably be done so that the condition of the piston, rings and big-end bearings can be examined. To remove the cylinder barrel after removal of the head, simply lift the barrel off the five long studs. To remove the piston, remove one of the circlips holding the

gudgeon pin in place, push out the pin and lift the piston from the connecting rod. Note that the piston has a split skirt and that the split should face forwards. The piston is marked with the word "Front" by the leading valve depression in the piston crown.

- 24 Removal of Valves.** Lift or prise off the hardened caps from the ends of the valve stems, then, compress the valve springs with a suitable compressor. Lift out the split, conical collars and remove the compressor when the springs and valves may be withdrawn. Keep the end caps, split collars, springs and other parts paired off with their respective valves and replace them in the same positions when reassembling.

On the "Crusader Sports" there is some slight difference in valve spring anchorage. There are no end caps on the valve stems and the alloy top spring collars are retained by split conical cotters which have a narrow internal projection which fits into a corresponding groove in the valve stem.

- 25 Removal of Carbon.** Remove carbon from the valves, ports and combustion chamber by scraping or (only if the cylinder head is cast iron) by immersion in a solution of 4 ozs. of commercial potash to a gallon of water. Carefully remove the piston rings. Remove carbon from the ring grooves and the top of the piston by carefully scraping, taking care not to dig into the aluminium. **On no account allow potash solution to come into contact with the aluminium piston.**

- 26 Grinding-in Valves.** Smear the valve seats with a little grinding compound, replace the valve in position and rotate it with a semi-rotary motion by using a tool with a suction cap frequently lifting it off its seat and gradually working the valve round so that each point on the valve face comes into contact with each part of the seat. Continue grinding until a bright ring is obtained on both the valve and its seating.

If the valve or seats are very badly pitted and will not form good faces with a reasonable amount of grinding, the parts should be returned to the Works for

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new seats to be cut. Excessive grinding forms a pocket which restricts the flow of the gases.

Do not interchange the inlet and exhaust valves.

- 27 Reassembly of Engine after Decarbonising.** When reassembling the engine take great care to have all parts perfectly clean and put clean oil on the piston, particularly round the rings. The cylinder base joint must be made with a paper washer, the cylinder head joint with a new copper and asbestos gasket. When replacing the push rods, note that the longer of the two is the inlet rod and it should pass through the outer of the two holes in the base of the cylinder barrel. When tightening down the cylinder head nuts, work diagonally from one to another to ensure pulling the joint down level.

Before setting the valve clearances see that the end caps are on the valve stems.

The cylinder head nuts should be checked again for tightness, after the engine has been run long enough to get it thoroughly warm.

Should the engine breather, which is situated on the top of the front end of the crankcase, be removed, make certain that the two small disc valves are preserved and suffer no damage. Ensure that the discs and their housing are perfectly clean when they are reassembled.

- 28 Valve Clearances.** The adjusting screws are on the top ends of the push rods. Access to them is obtained by removing the rocker box cover. The clearances, measured between the valve end caps and the rockers when the engine is cold, should be .006" exhaust and .004" inlet.

With a cold engine, the clearances on the "Crusader Sports" should be adjusted to .002" inlet and .004" exhaust.

To make the adjustment (see Fig. 3), first rotate the engine so that the piston is near T.D.C. on the compression stroke, hold the push rod top end (bottom hexagon) and the locknut (middle hexagon). Unlock by turning the locknut to the right and make the adjustment by screwing

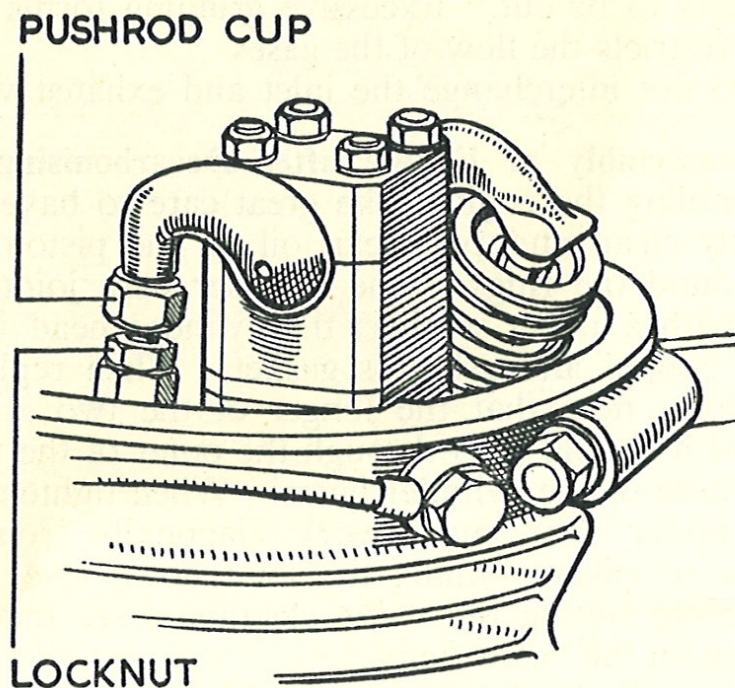


Fig. 3.—Valve Clearance Adjustment.

the push rod cup (top hexagon) to the right to take up clearance or to the left to give more clearance, at the same time holding the push rod top end. Finally, lock up the locknut against the push rod end and check the clearance after finally tightening the locknut.

Owing to the initial bedding down of the wearing surfaces, the valve clearances on new machines may require adjustment after the first few hundred miles have been run.

- 29 **Engine Bearings.** The crankshaft runs on a large-diameter ball bearing at the driving end and a roller bearing at the generator end. The ball bearing provides positive end location for the shaft and, providing that the driving sprocket nut is securely tightened, there will be no apparent end float. The light alloy connecting rod has a split big end with renewable white-metal lined steel shells. Some side float and a perceptible amount of "shake" may be present in the big-end bearing but if, after a long period of use, definite

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up-and-down play can be felt in either the big end or the main bearings, the engine will have to be removed from the frame for new parts to be fitted.

The gudgeon pin is fully floating and of large diameter. When the engine is cold it should be a free working fit in the small end of the rod and a push fit in the piston bosses.

30 Removal and Dismantling of Engine. Probably most Royal Enfield owners will never find it necessary to remove the engine from the frame and if, after a long period of use, an overhaul is required, will send the machine back to the Works. Therefore, details of engine removal and dismantling will not be given here.

31 Timing Chain Adjustment. The camshaft is chain driven from the near-side end of the crankshaft. To obtain access to the chain, remove the near-side engine cover, first placing a tray beneath the engine to catch escaping oil. Slacken the two tensioner nuts and adjust to give a minimum of slackness in the chain. After replacing the chaincase cover, replenish with about one-third of a pint of engine oil before starting engine.

32 Valve Timing. If the timing chain is removed for any reason, e.g., the fitting of a new primary chain, place the piston at top dead centre and line up the marks on the timing sprockets, as shown in Fig. 4, before replacing the chain. Adjust the chain tension as described in Section 31.

For those who wish to check the valve timing the opening and closing points are given below.

On 1960 models the following instructions apply:—
Valve Timing with .015 in. Clearance:

"250 Clipper" and "Crusader 250"—

Exhaust opens	...	...	...	95° before B.D.C.
Exhaust closes	...	...	...	37° after T.D.C.
Inlet opens	...	...	...	60° before T.D.C.
Inlet closes	...	...	...	65° after B.D.C.

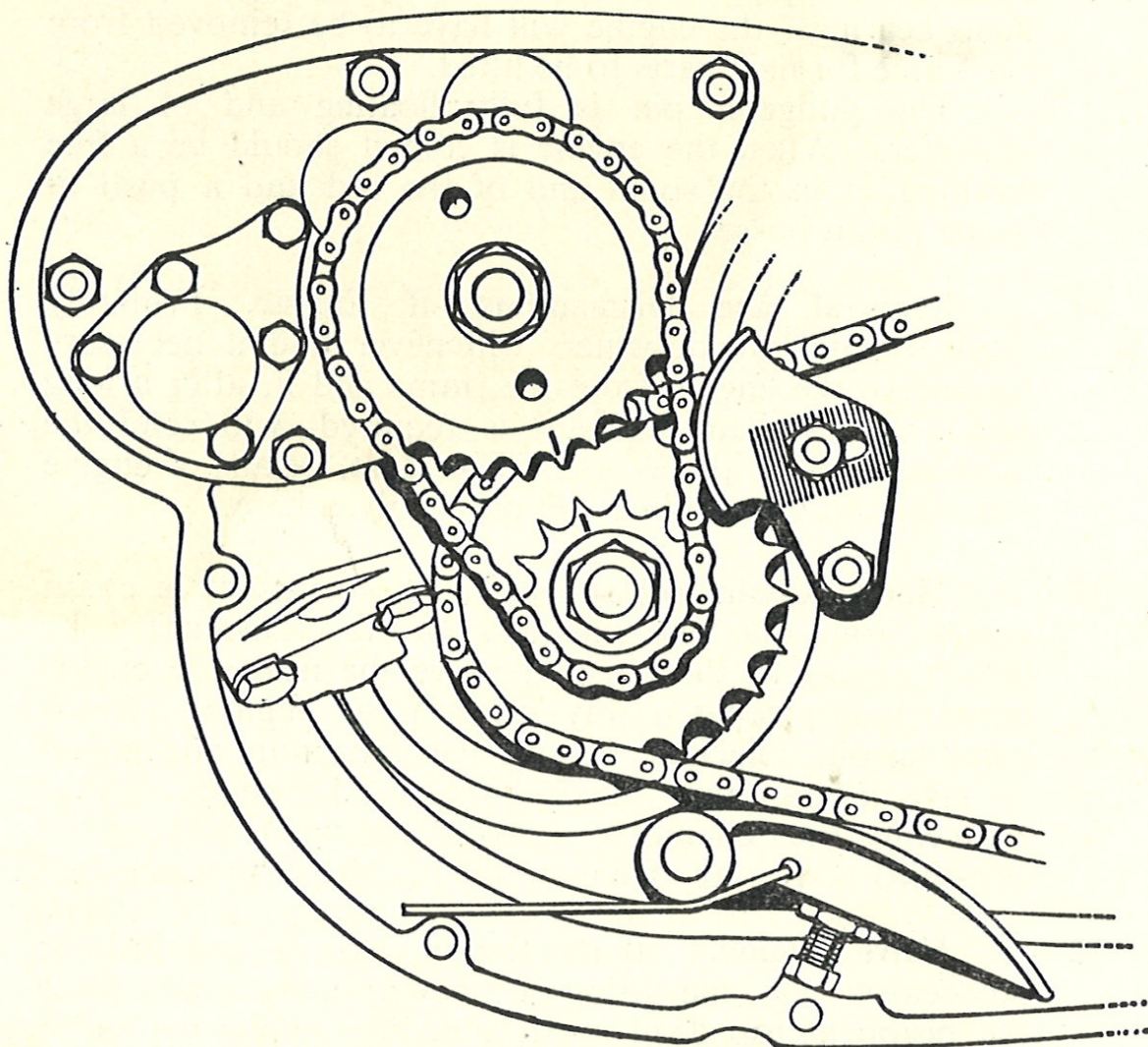


Fig. 4.—Timing Chain Adjustment.

Timing and Primary Chains have adjustable slippers for achieving the correct chain tension. Note, also, the timing marks on the timing chain sprockets.

Valve Timing with .010 in. Clearance:

"Crusader Sports"—

Exhaust opens	...	...	...	68° before B.D.C.
Exhaust closes	...	...	...	45° after T.D.C.
Inlet opens	...	...	...	38° before T.D.C.
Inlet closes	...	...	...	67° after B.D.C.

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Earlier Models:—

"250 Clipper" and "Crusader 250"—

Exhaust opens	...	...	...	75° before B.D.C.
Exhaust closes	...	...	...	30° after T.D.C.
Inlet opens	...	...	...	45° before T.D.C.
Inlet closes	...	...	...	65° after B.D.C.

These points are all given at $\cdot 015''$ valve clearance and it is important that this clearance should be used when checking, as the first part of the valve lift is comparatively slow and a small variation in clearance considerably alters the opening and closing points. For running, set to the clearances given in Section 28.

"Crusader Sports." There should be a running valve clearance of approximately $\cdot 005^\circ$ to $\cdot 008^\circ$ and the valve timing with this clearance should be:—

Exhaust opens	...	...	...	75° before B.D.C.
Exhaust closes	...	...	...	50° after T.D.C.
Inlet opens	...	...	...	50° before T.D.C.
Inlet closes	...	...	...	75° after B.D.C.

- 33 Ignition Timing.** The contact breaker is accessible after removing the small circular cover at the front of the off-side crankcase cover. Owing to the provision of automatic ignition advance, the contact breaker is always fully retarded when the engine is at rest or is being turned over slowly. The advance mechanism is situated behind the contact breaker and gives a range of approximately $12\frac{1}{2}^\circ$ on the half-speed shaft, corresponding to 25° on the engine shaft.

The optimum ignition timing is 30° advance ($7/32''$ before T.D.C.) so that in the fully retarded position the contact points must be open when the piston is 5° or about $1/64''$ before T.D.C.

To time the ignition, proceed as follows:—

Switch off and check the maximum opening of the points, which must be $\cdot 014''$ to $\cdot 016''$.

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Unscrew and remove the centre screw securing the contact breaker cam centre to the shaft and withdraw the latter from the shaft.

Loosen the two small screws which secure the contact breaker base plate and set the plate central in its slots. Tighten the screws.

Place the machine on the stand. Engage top gear and turn the engine by rotating the back wheel until the piston is $1/64$ " before the top of the compression stroke, as measured by a rod or wire inserted through the plug hole, both valves being closed.

Switch on the ignition and rotate the cam centre in a clockwise direction (viewed from the off-side of the machine) until the ammeter is showing a discharge. Continue rotating slowly until the needle flicks to zero, indicating that the points have opened.

Give the cam centre a sharp tap endways to secure it on the shaft and lock up tightly with the centre screw.

Check timing by turning the engine with the back wheel until the ammeter needle moves from discharge to zero and see that the piston is $1/64$ " before the top of the compression stroke.

If timing is slightly incorrect, adjust by loosening the two screws which secure the contact breaker base plate to the crankcase and turn the plate clockwise to retard the timing, anti-clockwise to advance it. The slots in the plate provide a range of adjustment equal to approximately $\pm 39^\circ$ on the engine shaft. This will prove sufficient to cover normal adjustment due to wear of contact points and contact breaker arm, movement of the cam only being necessary should the timing have slipped or after dismantling of the engine.

- 34 Sparking Plugs.** The following are the plugs which we have found to be most suitable for these models:—
Lodge 2 H.N., K.L.G.F.80, Champion L.10.S. or L7.

LIGHTING SET

The electrical equipment fitted to these machines combines the advantages of a Magdyno (or magneto and separate dynamo) system with those of a battery and coil ignition system with a D.C. dynamo to charge the battery, and has advantages over both these systems.

The generator consists of a rotor mounted on the end of the driving shaft of the engine and containing six powerful permanent magnets arranged to produce six poles alternately north and south.

Surrounding the rotor are three pairs of series-connected coils carried on a laminated core plate mounted directly on to the crankcase.

Rotation of the rotor in the stator produces an alternating voltage in the stator coils. Electrical connection is made between the stator coils and a full wave selenium rectifier which acts in effect like a non-return valve, permitting current to pass in one direction only so that the output from the rectifier is uni-directional current which can be used to charge a battery.

The headlamp is mounted in a specially designed "Casquette" fork head which contains an ammeter and a lighting switch. A two-position ignition switch is mounted in the near-side tool-box cover.

Switch Positions

Emergency Start. An emergency starting position is provided on the ignition switch. This is for use if the battery has become discharged and a normal start cannot be made. In the switch position "EMG" the alternator is connected directly to the ignition coil and this allows the engine to be started independently of the battery. Note that, if the battery is removed, the emergency start will not function unless the lead normally connected to the battery negative terminal is earthed. The emergency start system functions better with a discharged battery than with a fully-charged one.

Proper functioning of the emergency starting feature is dependent on accurate ignition timing being

observed and correct contact breaker gap being maintained. After starting has been effected, the ignition switch should be turned to the normal running "IGN" position.

Short journeys without the battery can be made with the switch in the "EMG" position. To do this, the cable normally connected to the battery negative terminal must be connected to an earthed point on the machine. If lights are required when the battery is disconnected, use the headlights and keep the engine speed low to prevent excessive voltage rise.

Ignition Off, Lights Off. Battery and generator are both disconnected.

Ignition On, Lights "Off" or on "L". Two pairs of alternator coils are disconnected and only the third pair is in use. Current passing through the rectifier trickle charges the battery as well as energising the ignition coil.

Ignition On, Lights on "H". The alternator output is increased by connecting all three pairs of coils in parallel, thus providing current for the headlight, tail and speedometer lights in addition to the ignition and a trickle charge to the battery.

Battery.

Batteries on machines supplied in England, Scotland and Wales are supplied filled and charged ready for use.

Batteries on machines supplied overseas are in the "dry charged" condition. These require only filling with sulphuric acid of 1.250 density and allowed to stand for one hour before being put into service.

If an "unformed" dry battery is fitted it must be filled with acid of 1.285 density and given a long slow continuous charge of 0.8 amps. for 32 hours before being put into service. This process is necessary to form the correct chemical compounds in the battery plates, and if not carried out the battery will have a short life and a high resistance which will prevent it accepting the correct rate of charge from the rectifier.

The battery is housed in the left-hand side of the box under the saddle and the level of the acid solution should be inspected at least once a fortnight.

The electrolyte (acid) must be filled only to the top of the separators between the plates and this level must be maintained by regular additions of pure distilled water.

All lead-acid batteries slowly discharge themselves when standing, and if allowed to stand in a discharged state will become sulphated and spoilt. If the machine is laid up for any length of time, therefore, the battery should be removed, charged fully and given a refresher charge every two or three weeks.

Batteries used on rectifier sets lose their charge more rapidly than others owing to a small leak through the rectifier. If it is known that the machine will not be run for several days, but the period of inactivity is insufficient to justify removal of the battery, it is a good plan to disconnect the battery earth lead, thus preventing leakage through the rectifier.

Lamps.

The following are the correct type of lamp bulb to use:—

Headlamp main bulb: 6v. 30×24 watt (Pre-focus) S.B.C.

Pilot bulb: 6v. 3 watt M.B.C.

Tail lamp: 6v. 3×18 watt S.B.C.

Speedometer: 6v. 1·8 watt M.B.C.

A double filament tail lamp bulb is fitted enabling a stop lamp switch to be added if required.

- 36 Carburettor.** The carburettor is correctly set at the Works, and is unlikely to require attention beyond occasional cleaning, and possibly resetting the slow running adjustment.

This adjustment is made with a small milled-head screw on the side of the carburettor. The adjustment should be made when the engine is warm and should be set so that the engine will "tick-over" evenly when the throttle is nearly closed. A throttle stop is also provided so that the throttle can be set to be slightly open when the control is shut.

Do not attempt to save petrol by fitting a smaller main jet. The main jet has no effect unless the machine is being driven at above half throttle.

If the machine uses an excessive amount of petrol, look for possible leaks, check the slow running adjustment and try lowering the taper needle (held in the throttle slide) one notch. Examine also possible causes in the machine, such as brakes binding, tight or dry chains, incorrect tappet adjustment, slipping clutch, etc.

The following are the correct carburettor settings :—

Main jet : 120.

Throttle valve : $375/3\frac{1}{2}$.

Needle clip in No. 3 groove.

Needle jet : 105.

Pilot jet : 25.

Full particulars of the carburettor are given in a booklet issued by the makers, a copy of which we will supply on request.

On the "Crusader Sports" the carburettor details are :—

Choke : $\frac{15}{16}$ in.

Main jet : 140.

Throttle valve : $376/3\frac{1}{2}$.

Needle clip in No. 3 groove.

Needle jet : 106.

Pilot jet : 25.

There is a $\frac{3}{16}$ in. heat barrier washer between the carburettor flange and the cylinder head.

- 37 **Air Cleaner.** The air cleaner ensures that no dust or grit reaches the interior of the engine, thus preventing rapid wear of the cylinder. Provided that the correct carburettor jet is used, the air cleaner does not cause any loss of speed.

To obtain access to the air cleaner, first remove the toolbox lid on the right-hand side of the machine. The air cleaner cover, held in place by one central screw, will now be visible. Remove this screw and press inwards the top left corner of the cover, which will pivot outwards at the bottom, enabling it to be removed

entirely. To remove the cleaner, hold it by the metal portion and pull to the left, when it will free itself from the rubber sleeve.

The cleaner is intended to be used dry and should not be oiled. It can be cleaned by brushing and blowing with compressed air. As the air passes through the element from outside to inside, the bulk of the dirt will be found on the outer surface of the element.

TRANSMISSION

- 38 Enfield Four-speed Gear.** This gearbox is very simple in operation and provided it is kept well lubricated will give long and trouble-free service. **A special feature is that the gears are controlled by a single-striking fork so that it is quite impossible to engage two gears at once, no matter how much wear has taken place.**

The foot control lever is adjustable to suit different footrest positions. The lever is mounted on a serrated shaft and, after slackening the clamping screw, can be removed and replaced on a different serration.

- 39 Clutch.** The clutch is of the multi-plate type, with cork inserts. If clutch slip occurs, first make sure that there is some slack in the control wire (see next Section). If this is in order, the clutch plates should be examined. To do this remove the primary chain case on the left-hand side of the engine and unscrew the three pins near the centre of the clutch. The springs and plates may now be lifted away. If the cork inserts are worn flush with the metal or are burnt, they should be renewed. Cork clutches grip equally well whether oily or dry but wear better when oil is present. If the machine has been run for some time with a slipping clutch, new springs as well as new inserts may be required.

- 40 Adjustment of Clutch Control. Important.** It is absolutely essential that there should be a small amount of free movement of the clutch control lever. If this is not present, part of the spring pressure will be taken by the clutch control wire instead of by the friction

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surfaces, clutch slip will result, and the clutch inserts may be ruined.

To adjust the control, first slacken off the clutch cable adjustment which will be visible after sliding up

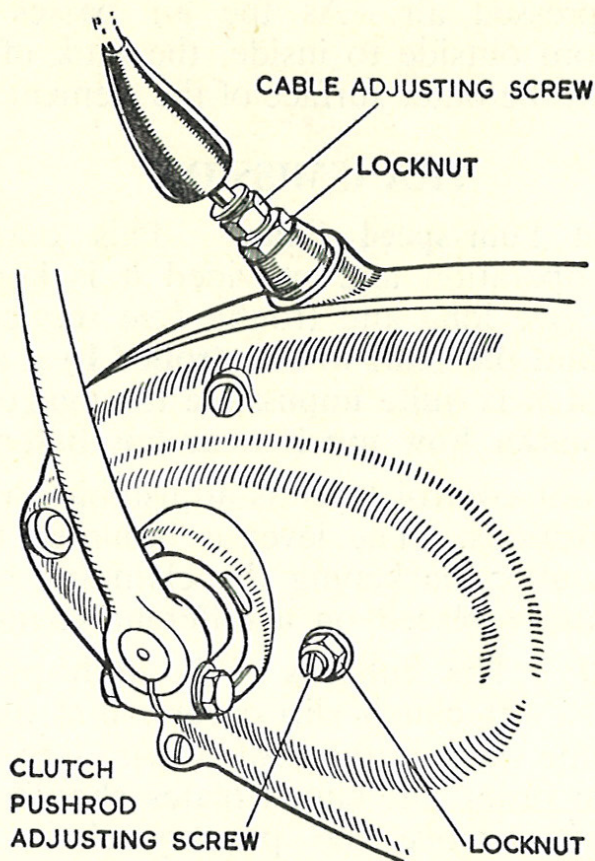


Fig. 5.—Clutch Adjustments.

the plastic cover (see Fig. 5). Slacken off the locknut on the spindle which protrudes from the right-hand crankcase cover immediately in front of the kick starter spindle. Turn the slotted adjusting screw clockwise until it begins to tighten up, then turn back one complete turn and lock in this position with the locknut. This will ensure that the clutch lever inside the cover is in the best working position. Adjust the clutch cable to give about $\frac{1}{16}$ " free movement.

NOTE.—Owing to the initial bedding down of the clutch friction material, it frequently happens that the

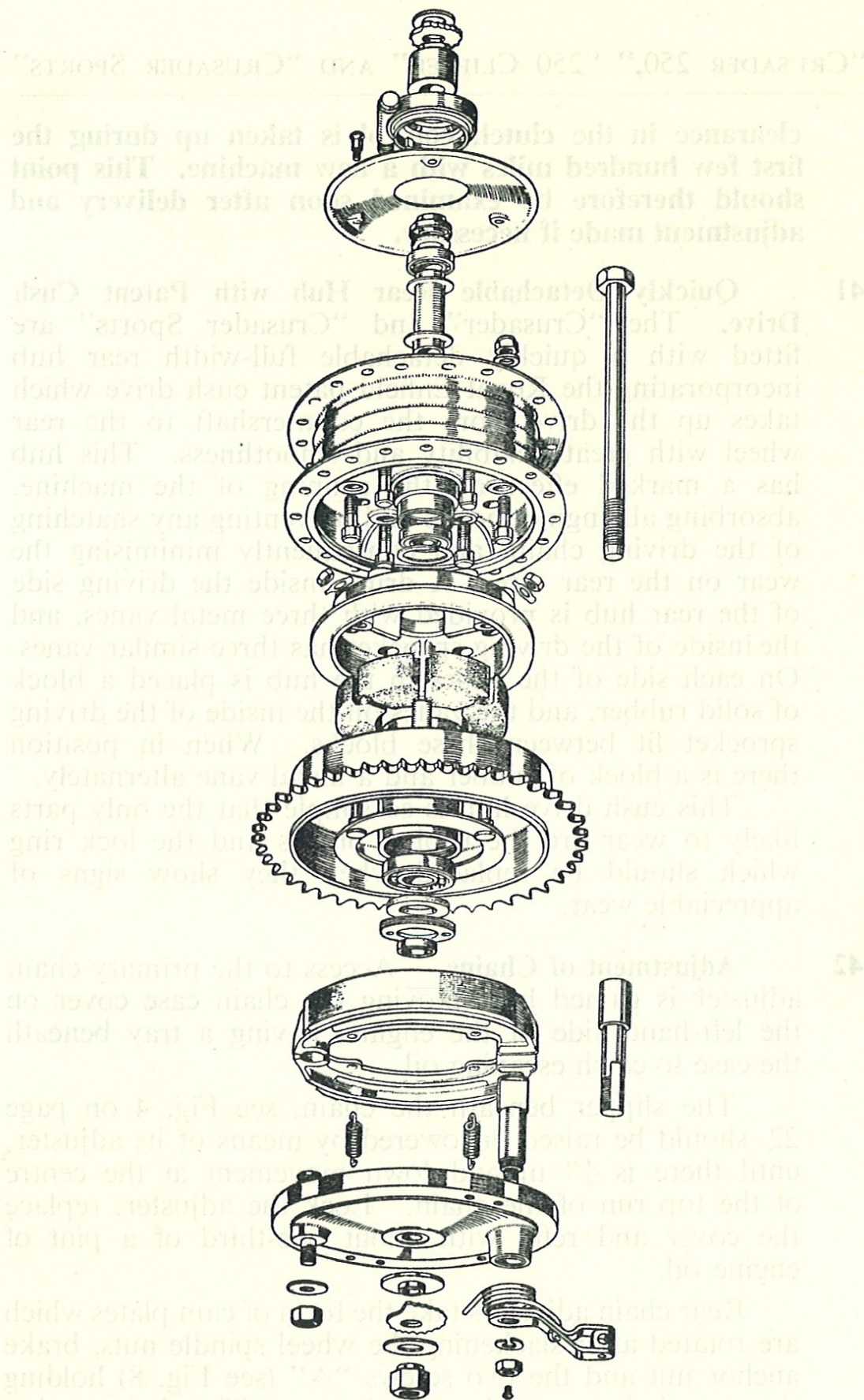


Fig. 6.—Exploded View of Q.D. Rear Hub.

clearance in the clutch control is taken up during the first few hundred miles with a new machine. This point should therefore be examined soon after delivery and adjustment made if necessary.

- 41** **Quickly Detachable Rear Hub with Patent Cush Drive.** The "Crusader" and "Crusader Sports" are fitted with a quickly detachable full-width rear hub incorporating the Royal Enfield patent cush drive which takes up the drive from the countershaft to the rear wheel with great flexibility and smoothness. This hub has a marked effect on the running of the machine, absorbing all engine shocks and preventing any snatching of the driving chain, and consequently minimising the wear on the rear tyre. A drum inside the driving side of the rear hub is provided with three metal vanes, and the inside of the driving sprocket has three similar vanes. On each side of the vanes in the hub is placed a block of solid rubber, and the vanes on the inside of the driving sprocket fit between these blocks. When in position there is a block of rubber and a metal vane alternately.

This cush drive hub is so simple that the only parts likely to wear are the rubber blocks and the lock ring which should be replaced when they show signs of appreciable wear.

- 42** **Adjustment of Chains.** Access to the primary chain adjuster is gained by removing the chain case cover on the left-hand side of the engine, having a tray beneath the case to catch escaping oil.

The slipper beneath the chain, see Fig. 4 on page 22, should be raised or lowered by means of its adjuster, until there is $\frac{1}{4}$ " up-and-down movement at the centre of the top run of the chain. Lock the adjuster, replace the cover and refill with about one-third of a pint of engine oil.

Rear chain adjusters take the form of cam plates which are rotated after slackening the wheel spindle nuts, brake anchor nut and the two screws "A" (see Fig. 8) holding the rear chaincase to the swinging arm. The chain tension

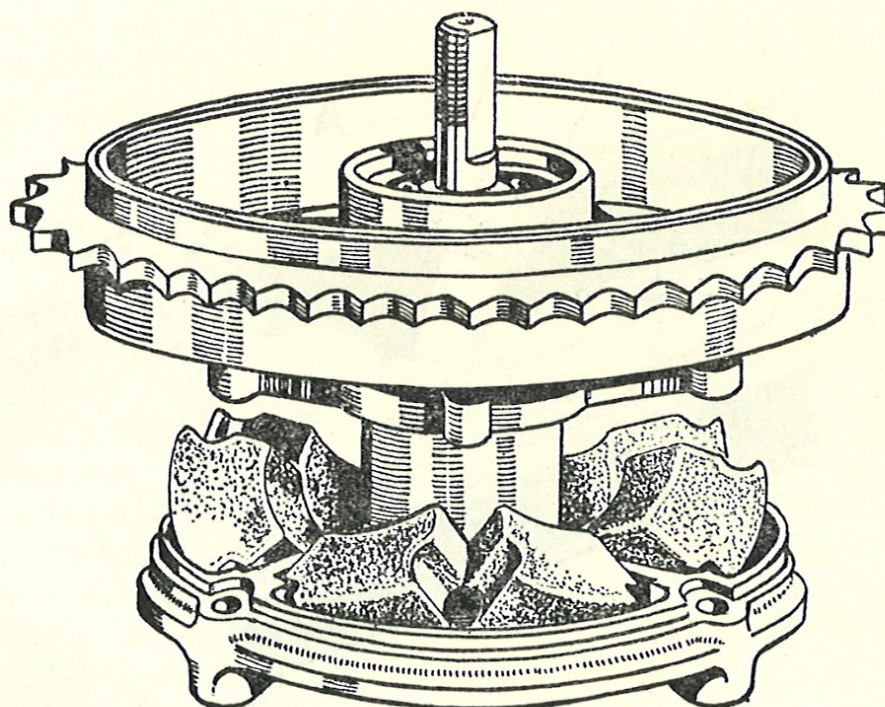


Fig. 7.—Reassembly of Cush Drive.

In assembling the cush drive hub, set the rubbers against each other, as shown, to provide a lead for the vanes.

can be ascertained after removal of the rubber plug in the side of the chaincase. Adjust until there is $\frac{1}{2}$ " of free movement in the top run of the chain. Tighten all nuts and screws and then check for correct wheel alignment and truth of the chain line. If it is impossible to get both of these correct at the same time, suspect an untrue frame as a result of some accident.

After adjusting the rear chain it may be necessary to re-adjust the rear brake; check this point.

Chain adjustment on the "250 Clipper" is carried out by means of cam plates as described above, but since there is no chain enclosure it is not necessary to slacken any screws on the chain guard which, in this case, protects the top run of the chain.

FRONT FORK

43 Construction. The "Casquette" at the top of the fork houses the headlamp, speedometer, ammeter and

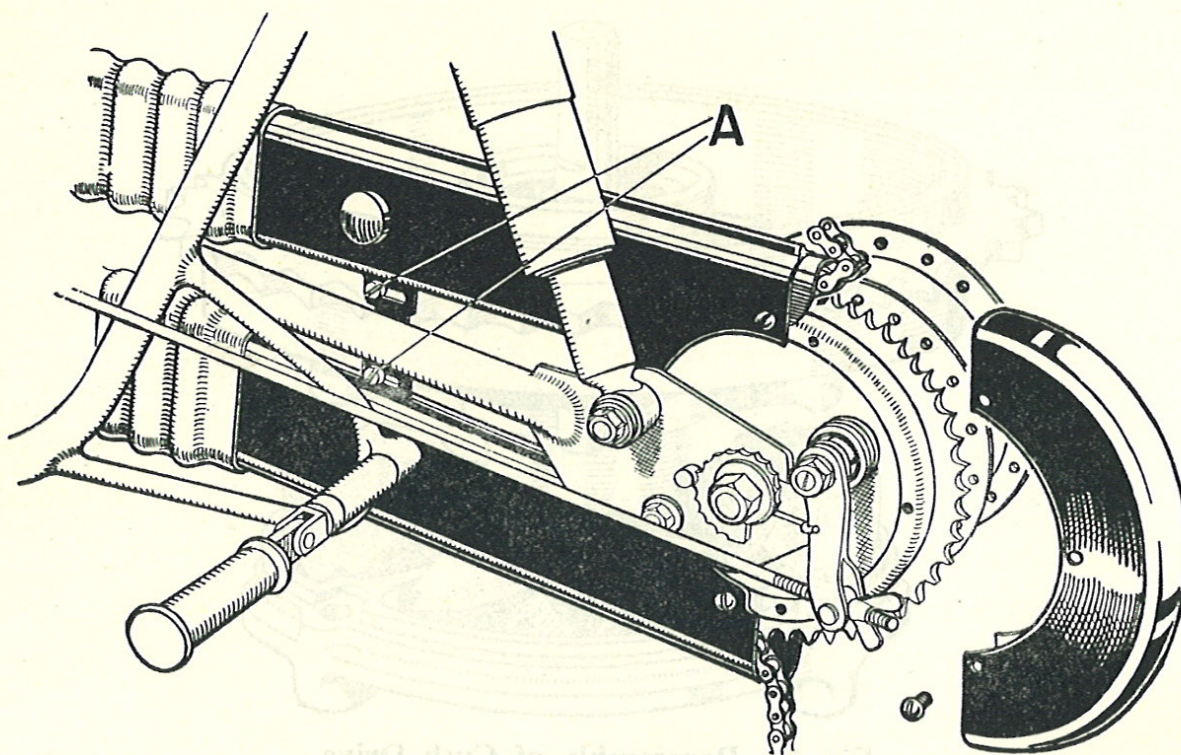


Fig. 8.—Rear Wheel Adjustment, showing movement of "Crusader" Rear Chaincase and detachable part of Chaincase "exploded".

lighting switch, the two latter being held in rubber housings pressed into the casting. The upper head bearing race is also fitted to the "Casquette" and the steering stem is anchored to it by a large hexagon nut screwing on to the top of the stem which is secured by a wedge bolt having an Allen type head tightened from behind and below the handlebar mounting.

Each main tube is screwed into the "Casquette" at the upper end and securely clamped to the fork crown. Sliding over the lower end of the main tube is the cast aluminium-alloy fork leg. Into the lower end of this is fitted a tube to which the bottom end of the compression spring is secured, the tube also acting as a guide for the spring. The top end of the spring is secured to a distance tube which is held to the top of the main tube with a screw. The lower end of the main tube and upper end of the sliding fork leg are protected by a cover tube screwed to the fork crown.

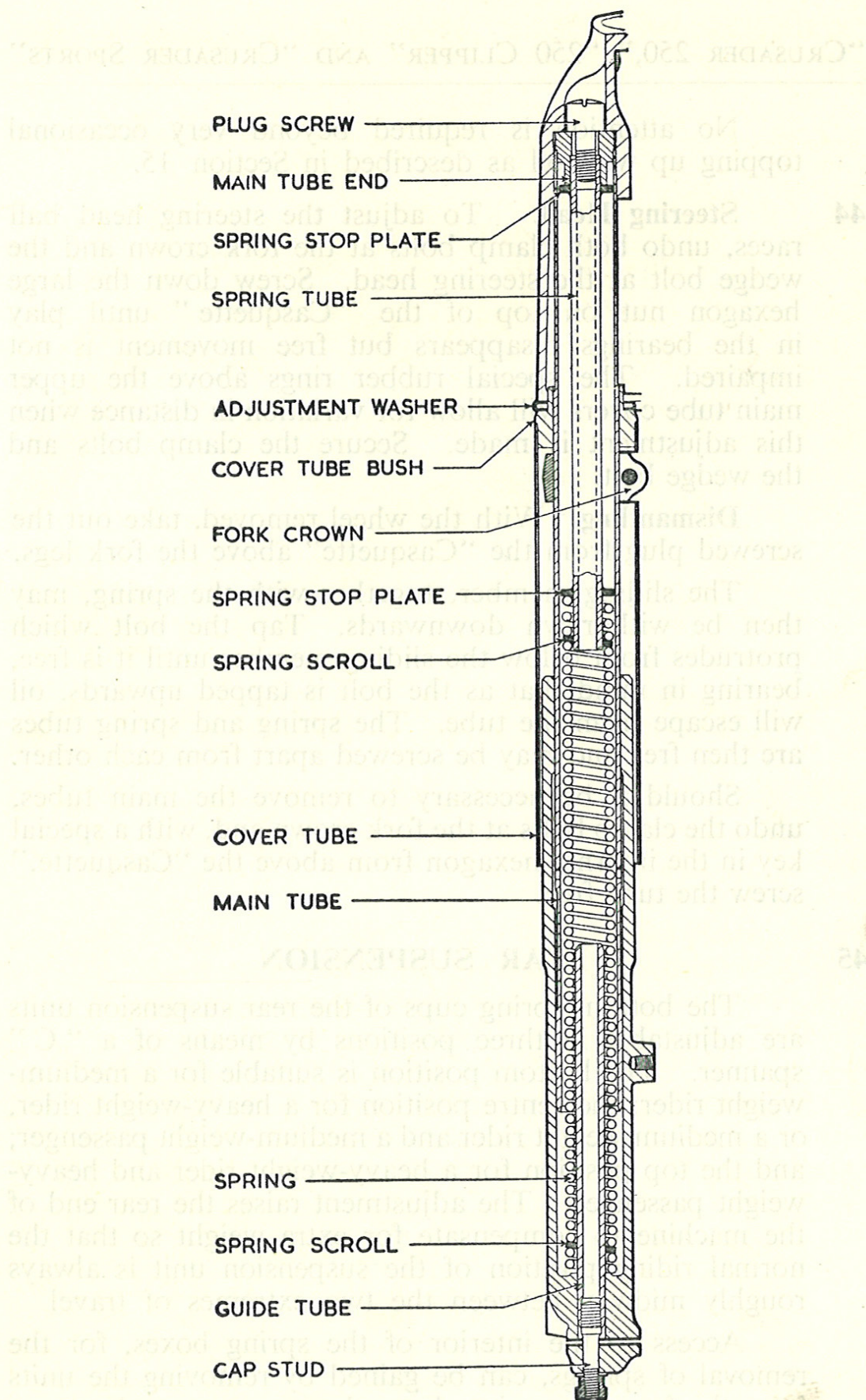


Fig. 9.—Section of Front Fork.

No attention is required beyond very occasional topping up with oil as described in Section 15.

- 44 Steering Head.** To adjust the steering head ball races, undo both clamp bolts at the fork crown and the wedge bolt at the steering head. Screw down the large hexagon nut on top of the "Casquette" until play in the bearings disappears but free movement is not impaired. The special rubber rings above the upper main tube covers will allow for variation in distance when this adjustment is made. Secure the clamp bolts and the wedge bolt.

Dismantling. With the wheel removed, take out the screwed plug from the "Casquette" above the fork legs.

The sliding member, together with the spring, may then be withdrawn downwards. Tap the bolt which protrudes from below the sliding member until it is free, bearing in mind that as the bolt is tapped upwards, oil will escape from the tube. The spring and spring tubes are then free and may be screwed apart from each other.

Should it be necessary to remove the main tubes, undo the clamp bolts at the fork crown and, with a special key in the internal hexagon from above the "Casquette," screw the tube free.

45 REAR SUSPENSION

The bottom spring cups of the rear suspension units are adjustable in three positions by means of a "C" spanner. The bottom position is suitable for a medium-weight rider; the centre position for a heavy-weight rider, or a medium-weight rider and a medium-weight passenger; and the top position for a heavy-weight rider and heavy-weight passenger. The adjustment raises the rear end of the machine to compensate for extra weight so that the normal riding position of the suspension unit is always roughly midway between the two extremes of travel.

Access to the interior of the spring boxes, for the removal of springs, can be gained by removing the units from the frame, pressing down the top cover and remov-

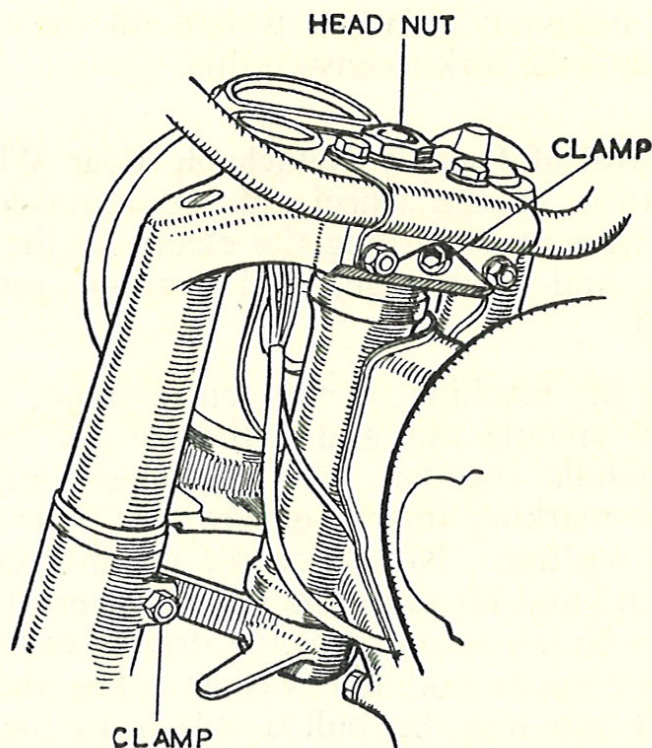


Fig. 10.—Steering Head Adjustment.

ing the split collar. Before removing the boxes it is first necessary to remove the rear mudguard unit as described in Section 48. When reassembling the boxes the spring should be greased to prevent rust and squeaking if it should come into contact with either of the covers. The central damping unit is sealed and servicing of the internal mechanism can be carried out only by the manufacturers. The rubber bushes in the top and bottom eyes can easily be renewed if necessary.

MISCELLANEOUS

- 46 Removal of Front Wheel.** To remove the front wheel, place the machine on the centre stand with sufficient packing (about 2") beneath each side of the stand to lift the wheel clear of the ground when tilted back on to the rear wheel. Disconnect the front brake cable, remove the nuts securing the caps to the fork ends, and the wheel will drop out. Make sure that the machine stands securely on the rear wheel and centre

stand—if necessary, place a weight on the saddle or a strut beneath the fork to ensure this.

- 47 Removal of Quickly Detachable Rear Wheel.** The main portion of the wheel can be removed from the machine without disturbing the chain, or the rear brake operation and anchorage, and without removing the mudguard.

With the machine on the centre stand, unscrew the right-hand spindle nut and withdraw the loose section of the spindle together with the chain adjuster cam, preferably marking this to ensure that it is replaced in the same position. Now slide the distance collar out of the fork end and lift away the speedometer drive gearbox which can be left attached to the driving cable. Remove the spacing collar and felt washer. The main body of the wheel can now be pulled across to the right-hand side of the machine, thus disengaging the six driving pins from the cush drive shell. Standing on the left-hand side of the machine, adjacent to the rear mudguard, lean the machine to the left until the wheel can be rolled out between the mudguard and the right-hand fork end.

When replacing the speedometer drive gearbox, make sure that the driving dogs inside the gearbox engage with the slots in the end of the hub barrel. Before tightening the centre spindle make sure that the speedometer drive gearbox is correctly positioned so that there is no sharp bend in the driving cable.

Removal of Non-Detachable Rear Wheel. In the case of the "250 Clipper," which is not fitted with a quickly detachable rear wheel, the method of rear wheel removal is as follows:—

Disconnect the driving chain at the spring link ; remove the wing nut from the brake rod and slide the rod from the lever ; disconnect the brake anchorage from the

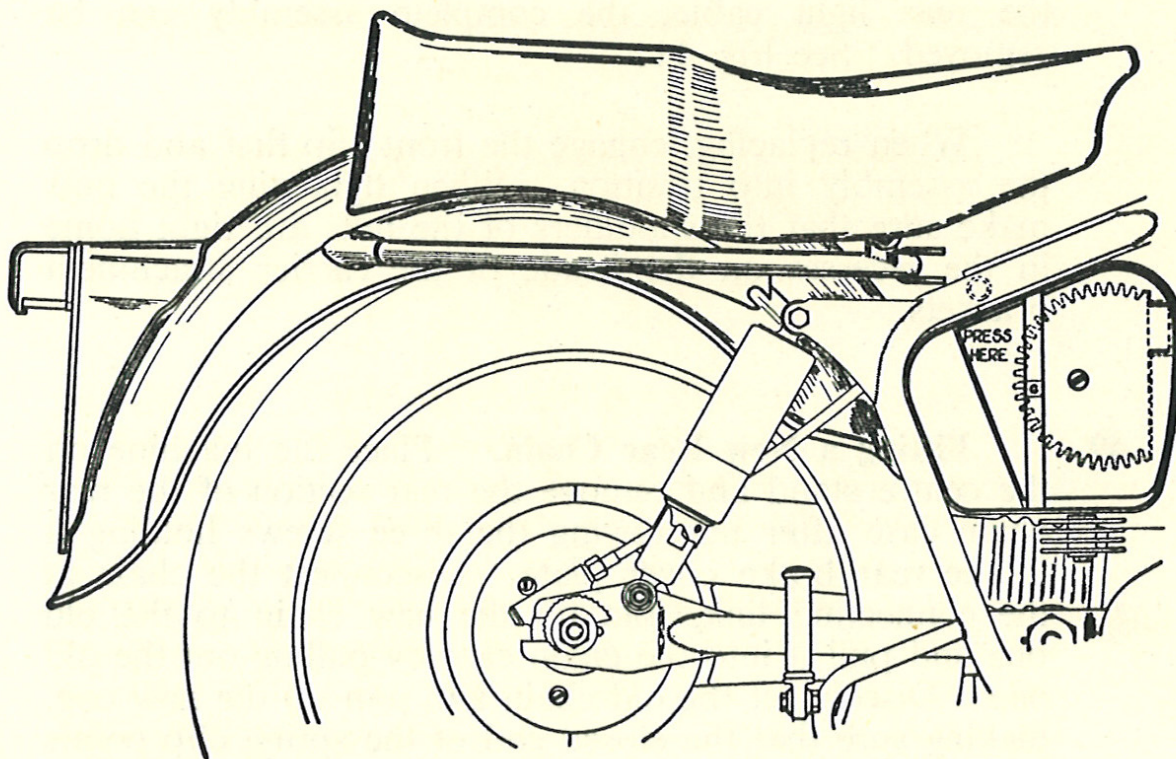


Fig. 11.

Removal of Rear Mudguard unit, also showing Air Filter.

rear fork lug ; unscrew the hexagon nut connecting the speedometer cable to the speedometer gearbox, withdraw the speedometer cable, undo the wheel spindle nuts and withdraw the wheel.

- 48 Removal of Rear Mudguard Unit.** The rear mudguard, mudguard carrier and dual seat are removable in one unit after merely slackening the two nuts on the inside of the rear suspension top fixing brackets. Stand behind the machine, grasp the lifting handles on each side and pull the mudguard assembly upwards until the attachment brackets are clear of their respective nuts. Now pull backwards until the clip at the front of the mudguard carrier is free from the back-stay bridge tube of the frame, when, after disconnecting

the rear light cable, the complete assembly can be removed. See Fig. 11.

When replacing, engage the front clip first and drop the assembly into position. When tightening the nuts make sure that the shoulders of the nuts are right home in the recesses on the inside of the carrier attachment brackets.

49 Fitting a New Rear Chain. Place the machine on the centre stand and remove the rear section of the rear chain case after unscrewing the three screws holding it to the rear brake cover plate. Disconnect the chain at the connecting link, join up the new chain to the old one and pull it into the chain case by pulling out the old one. Disconnect the old chain and join up the new one, making sure that the closed end of the spring clip points in the direction of travel of the chain. Check for correct chain tension and, if necessary, adjust as described in Section 42.

50 Removal of Tyres. The wired-on tyres fitted are easily removed if the correct procedure is adopted. Deflate the tyre by unscrewing the inside of the valve with the key formed on the dust cap. Remove the milled locknut securing the valve to the rim. At a point opposite the tyre valve, press the walls of the tyre down into the well in the centre of the rim, and work the walls down into the well as far as possible in either direction. It will then be found possible to lever off, starting at a point near the valve and working in either direction. When replacing the cover reverse this procedure, starting opposite the valve and finishing close to it with the tyre at the opposite side of the wheel pressed down into the rim. When only slightly inflated, see that the wired edges are in their proper places, not down in the well. As a check on this, examine the fine line moulded on the wall

of the tyre near the rim. This should be about a quarter of an inch from the rim, all the way round.

The following are the recommended tyre pressures for these models for solo use:—

Front : 18 lb. per sq. in. (Solo).

Rear : 19 lb. per sq. in. (Solo) ; if pillion passenger carried, 30 lb. per sq. in. approximately.

- 51 Expanding Hub Brakes.** The expanding hub brakes are fitted with shoes lined with a special woven material, and have drums of special cast iron giving freedom from scoring. Should an excess of grease find its way from the hub bearings on to the brake linings, the brake will lose a certain amount of its efficiency. In this case the shoes and linings should be taken out and scraped to remove the grease. After reassembly, drive with the brakes "on" for half a mile or so to burn off the last traces of grease.

The rear brake is adjusted by a wing nut at the end of the brake rod, while the front brake adjustment is by means of a milled nut.

- 52 Wheel Bearings.** The bearings of both wheels are single row, deep groove journal races. These have been proved by extensive tests to be superior to cup and cone bearings and are adequate to deal with both radial and thrust loads. They require no adjustment.

- 53 Cleaning.** The enamelled portions of the machine are best cleaned with cold water, using a brush for the wheels. A hose pipe is the ideal, but if buckets must be used, the parts can be prevented from drying with a "smeary" finish by swilling several buckets of cold water over the machine after washing.

The engine, gearbox and other parts which are greasy should be brushed with paraffin.

We recommend the use of "Autobrite" for enamel parts and polished alloy parts. For chromium we recommend "3-IN-ONE" Stop Rust Chrome Cleaner.

"DON'TS" FOR DRIVERS

DON'T let in the clutch with a jerk. This practice places unfair strains on the engine, transmission and tyres.

DON'T leave the brakes alone till the last moment and then have to apply them hard. This is only asking for skids and tearing miles off your tyres.

DON'T slam the throttle open suddenly. Give your machine an easy life and it will repay you.

DON'T slip the clutch to save changing gear. The clutch is for use, but this is abusing it.

DON'T be afraid of the lower gears. They are for use. On the other hand—

DON'T race the engine in a low gear when it will readily pull a higher one. This is abuse.

DON'T try to economise in grease or oil. They are cheaper than repair bills.

DON'T neglect the essential adjustments, particularly the tappets and the clutch control. If you do—

DON'T blame the makers for the inevitable consequences.

DON'T run your tyres too soft. They are expensive, but air is cheap.

DON'T neglect to consult our Service Department at any time.

Royal Enfield

MOTOR CYCLE GUARANTEE

TERMS AND CONDITIONS OF SALE

1. In this Guarantee the word "machine" refers to the new motor cycle, scooter, motor cycle combination or sidecar, as the case may be, purchased by the Purchaser.
2. In order to obtain the benefit of this Guarantee, the Purchaser must correctly complete the registration form and return it to us within fourteen days of the purchase.
3. We will supply, free of charge, a new part in exchange for, or, if we consider repair sufficient, will repair free of charge any part proved within six months of the date of purchase of any new machine, or within three months of its renewal or repair in the case of a part already renewed or repaired, to be defective by reason of our faulty workmanship or materials. We do not undertake to bear the cost of fitting such new or repaired part or accessory.
4. Any part considered to be defective must be sent to our Works, carriage paid, accompanied by the following information:
 - (a) Name of Purchaser and his address.
 - (b) Date of purchase of machine.
 - (c) Name of dealer from whom the purchase was made.
 - (d) Engine and frame numbers of machine.
5. This Guarantee shall not extend to defects or damage appearing after misuse, neglect, abnormal stress or strain, or the incorporation or affixing of unsuitable attachments or parts and in particular:
 - (a) Hiring out.
 - (b) Racing or competitions.
 - (c) Adaption or alteration of any part or parts after leaving our Works.
 - (d) The attaching of a sidecar in a manner not approved by us or to an unsuitable motor cycle.

This guarantee shall not extend to machines whose trade mark, name or manufacturing number has been altered or removed, or in which has been used any part not supplied or approved by us, or to tyres, saddles, chains, speedometers, revolution counters, and electrical equipment or to parts supplied to the order of the Purchaser and different from our standard specification.

6. Our liability and that of our dealer who sells the machine shall be limited to that set out in paragraph 3 and no other claims, including claims for consequential damage or injury to person or property, shall be admissible.
All other conditions and warranties statutory or otherwise and whether express or implied are hereby excluded and no guarantee other than that expressly herein contained applies to the machine to which this Guarantee relates or any accessory or part thereof.

REPAIRS GUARANTEE

1. While the highest standard of workmanship and materials is aimed at, we cannot accept liability for any defects appearing more than three months after the machine, assembly or component, has left our Works after being repaired.
2. We will repair or replace at our option free of charge any defective work, materials or parts relating to the repairs carried out by us appearing within that time but shall not be under any further or other liability for any other loss or damage whether direct or consequential and our liability shall be limited to the cost of so making good.
3. We do not accept liability in respect of parts of proprietary manufacture; e.g., tyres, saddles, chains, speedometers, revolution counters and electrical equipment which may be used by us in effecting a repair. All other conditions and warranties statutory or otherwise, express or implied are hereby excluded.

NOTICE

We do not appoint Agents for the sale on our behalf of our Motor Cycles or other goods, but we assign to Motor Cycle Dealers areas in which we supply to such Dealers exclusively for re-sale in such areas. No such Dealer is authorised to transact any business, give any warranty, make any representations or incur any liability on our behalf.

CYCLES & M...
Agence PUCH et PUC...
Réparations / toutes marques

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