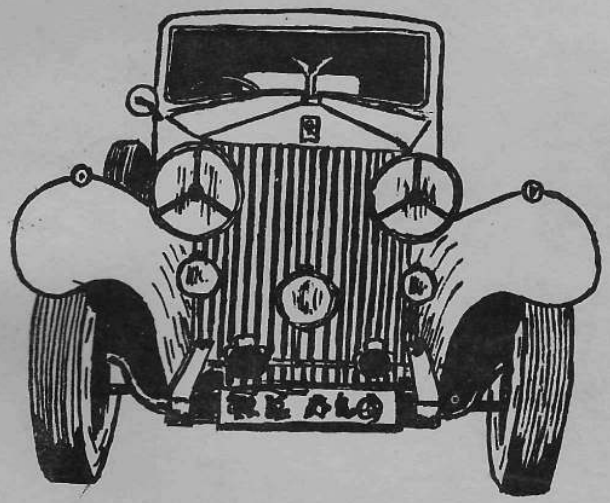
ROLLS-ROYCE



1925 - 39 MANUAL

J. H. HAYNES & CO. LTD.

ROLLS-ROYCE

Manual

Compiled and Edited by J.H. Haynes.

22-26 Lower Odcombe Yeovil Somerset

ACKNOWLEDGEMENTS

I am particularly indebted to the following for their assistance in helping me to produce this manual.

Rolls-Royce Limited.
The Librarian, Montagu Transport Library.
The Librarian, Science Museum Archives.

EDITOR'S PREFACE

A considerable amount of research and work has gone into the compilation of this manual. Information and facts have been checked and double checked to ensure the greatest possible accuracy.

Although extremely refined, in terms of modern automobile engineering, the current Rolls-Royce is perhaps not so advanced technically as cetain other makes, in particular Mercedes Benz. All those who linger after the grace and elegance of a bygone era will find much satisfaction in the Rolls-Royce models manufactured from 1925 to 1939 for these cars were undoubtedly the best in the world. They mark the summit of Rolls-Royce effort in automobile design and manufacture - and sadly for motorists the resources and energies used in their creation are now harnessed to the design and production of aero-engines. The cars of the '25 - '39 period were not the fastest, or the largest, or the easiest to drive, but in terms of mechanical refinement, comfort, reliability, and excellence of design and finish they hold no peers.

Even such cars as a Rolls-Royce require a certain degree of attention and servicing if they are to retain their performance and reliability. With increasing age, and perhaps frequently changing ownership, proper maintenance becomes of even greater importance. Original handbooks are rare, and when available very expensive. I have therefore produced this manual to aid all Rolls-Royce owners who require the essential information conducive to the proper functioning of their motor cars. It is also my hope that prospective owners will find the road tests, and notes on the buying of a used Rolls-Royce, of interest.

J.H. HAYNES
January, 1964

BIBLIOGRAPHY

The 20 H.P. Six-Cylinder Rolls-Royce Catalogue.

Instructions for the care and running of the 20 H.P. Rolls-Royce Car.

The 20/25 H.P. Rolls-Royce Catalogue.

Handbook of the 20/25 H.P. Rolls-Royce Car.

The 25/30 H.P. Rolls-Royce Catalogue.

The 25/30 H.P. Rolls-Royce "Wraith" Catalogue.

The 40/50 H.P. Six-Cylinder Rolls-Royce Catalogue.

Instructions for the care and running of the 40/50 H.P. Rolls-Royce Car.

Rolls-Royce – The Living Legend.

A Review of Rolls-Royce and Bentley Cars.

Contents

CHAPTER PAGE

1 The Rolls-Royce Method of Building Cars - Identification of Models, & Development History. 7

2 Starting Instructions - Engine & Chassis Specifications - General Maintenance & Servicing Information for all Rolls-Royce 20 Models. .. 16

3 Starting Instructions - Engine & Chassis Specifications - General Maintenance & Servicing Information for all Rolls-Royce 20/25 Models. . 22

4 Starting Instructions - Engine & Chassis Specifications - General Maintenance & Servicing Information for all Rolls-Royce 25/30 Models. . 29

5 Starting Instructions - Engine & Chassis Specifications - General Maintenance & Servicing Information for Rolls-Royce Phantom I & II. .. 34

6 The Rolls-Royce Phantom III. 57

7 Discriminate Buying, & the Cost of Running a Rolls-Royce. 62

8 Contemporary Driving Impressions & Performance Data for the Phantom I, II, & III, & the 20, 20/25, & the 25/30. 72

APPENDICES

I Rolls-Royce Inspection Report for Prospective Buyers. 81

II Oil Viscosity Lubrication Charts. 85

CHAPTER 1

The Rolls-Royce Method of Building Cars - Identification of Models, and Development History

Rolls-Royce. A name that to most people immediately brings to mind everything that is best and most luxurious in motor car construction. A name that in the 1920's and 1930's was spoken of with much respect by Kings and Presidents. A name that was frequently used as a yardstick for perfection. Rolls-Royce, the best car in the world.

What is it that led the name Rolls-Royce to be regarded all over the world as a synonym for unsurpassed excellence ? Why were these cars regarded as the best that money could buy? The basic answer to these questions lies in two parts. The first half of the answer can be found in the motto that Sir Henry Royce once quoted to Mr. Eric Gill, the famous sculptor, as being the principle upon which all his work was founded. The motto was "Whatever is rightly done, however humble, is noble". Mr. Gill was so impressed with these words that he carved them into the overmantle of Sir Henry Royce's dining room, in Latin, the motto reading "Quidvis recte factum quamvis humile praeclarum". The second half of the answer can be found in the simple incitements that were written above the benches of all Rolls-Royce employees, "Above all things be accurate" and "Always be certain". It was by designing cars in accordance with his motto, and by building them to the standards imposed by the two incitements, that Rolls-Royce motor cars came to be recognised as the finest in the world.

So it was that based on these principles, every item that went into the manufacture of a Rolls-Royce car was created with the ideal of being perfectly designed, and rightly done, so that it would function easily and correctly, as was expected of it, under all conditions, including the most arduous that could possibly be encountered. The fable that Rolls-Royce cars never broke down was founded on fact, and the

enormous numbers of this magnificent make that can still be seen gliding silently along the roads of Great Britain are lasting tributes to the excellence of the design and the quality of the workmanship that went into the construction of every single vehicle.

Some of the methods used by Rolls-Royce to ensure the pre-eminence of their products forms a fascinating study compared to the mass production methods of other manufacturers. One of the most remarkable research instruments Royce created, was a device to test prototype chassis to destruction, so that destruction itself could be eliminated. The device consisted of two enormous flywheels with irregular peripheries that when rotated simulated the worst bumps that a chassis could ever encounter, the flywheels being sunk in the floor of the test house in such a manner that it was possible to mount either the front or rear wheels of a car on them. When the flywheels started to revolve by means of a powerful electric motor, the suspension and chassis were subject to the most searching and intensive tests, that were intensified and accentuated as the flywheels turned faster and faster. Finally they achieved a speed that could never possibly be attained on roads anywhere in the world by the car under test.

Chassis after chassis, and part after part failed on this machine, but slowly and surely a chassis was redesigned and the parts rebuilt so that they would never break. So it was that Rolls-Royce were able to manufacture chassis that they claimed would run for a million miles or more. Thousands of other tests were used to ensure that when other cars broke down Rolls-Royce would still go on.

Examples of their endurance can be found everywhere. In the way they performed their tasks in merciless military use during the First World War, in their ability to cross country devoid of roads and tracks. In the sort of journey that was successfully undertaken by Mr. H.E. Symons and two friends, who calmly drove 12,482 miles to Nairobi from England and back in 34 days of running time. They crossed the Sahara Desert, appalling tracks in Nigeria and Kenya,

drove through tropical jungles and mountain passes in their Phantom III. One would naturally expect considerable wear and depreciation after a journey of this sort, but see what Mr. Symons had to say on his return to London. "Not a nut was loose, the axles and wheels were true. The Park Ward body was still as silent, as dustproof, and as watertight, as at the start of the great journey, and still no water has had to be added to the radiator since the car left Derby some 12,000 miles back."

So it was that cars were taken as far afield as Australia, Canada, Ceylon, India, China, Pakistan, South Africa, Iran and New Zealand, and many other countries, and operated there, sometimes under appalling conditions, with no service stations and no regular maintenance, for year after year after year.

The "bumping test" machine as it became known, showed that chassis rivets worked loose fairly quickly, so nickel steel nuts and bolts were used. The fixed radiator matrix split because of slight whipping of the chassis, so the radiator was mounted on ball joints in such a way that movement of the chassis would not affect it. It was found that when assembling components that were highly stressed many small bolts were far more effective than several large ones. In this manner nearly every item was slowly modified and altered till it became different from anything found on other cars of the period, and practically unbreakable.

Rolls-Royce Ltd. had its own foundry, where brightly glowing aluminium and iron where poured like quicksilver into sand moulds to be turned into connecting rods and pistons. Exhaustive tests were conducted concerning metal fatigue and every component was cast with a "tail" or test piece that had to be broken off to ensure the conformity of the metal both as to tensile and impact strength. This was not done to one in ten, but every single piece was subject to the same exhaustive testing and inspection, and anything that had the slightest hair line crack, or deformity was immediately discarded.

The care and attention that went into the manufacture of every single component can be seen in the way cantilever springs were made. After a careful check as to the quality of the steel, every leaf was polished by hand to a mirror-like smoothness, for only in this way was it possible to achieve the glide-like ride that has always been a characteristic of Rolls-Royce motor cars. Further, on the Phantom 1 the front springs which also act as radius rods, have a main leaf that used forged eyes for the shackles, whereas every other elliptic spring used on other cars for the same purpose have wrapped eyes. This is still so in 1963.

The Rolls-Royce radiator surrounds are made from solid nickel silver, instead of the more usual method of nickel plating onto steel, which is not rust proof, and will wear through after a time.

The foregoing is but a brief glimpse into the endless trouble and patience that was taken over the construction of every single Rolls-Royce and it is not difficult to realise why the marque acquired a reputation for un-paralleled excellence, and mechanical perfection that many competent engineers consider has not been surpassed by any manufacturer at any time.

Rolls-Royce engineering now leads the world in the field of aircraft engine design and manufacture, and it is particularly inspiring to consider that more than half the air-craft in use today, in more than one hundred airlines, use Rolls-Royce Gas Turbine engines. Rolls-Royce Avon Jet engines power the Comet 4B and are frequently fitted, on the request of the ordering airline, to the American Boeing 707.

To return to 1925. Rolls-Royce introduced the Phantom 1 or "New Phantom" as it was sometimes called, in this year. A year later production on the immortal Ghost finally ended after a run of nearly twenty years. The Phantom 1 continued in production till 1929, using a longer stroke engine than the Ghost, and developing about 100 b.h.p. The engine also used pushrod actuated overhead valves. Two lengths of chassis were offered. The long chassis (150½ in.) model sold for

£1,900, and the short chassis (144 in.) model for £1,850. Both were supplied without coachwork, which was built to the customers own specification by one of the specialised and well known carraige builders then operating, and would cost about £1,200. A total of 2,250 chassis were made of this model, and various modifications were carried out to them at different times. The first of these was the fitting of hydraulic shock dampers to the front springs early in 1927. In 1928 the radiator shutters were enclosed and at the very end of this year the cylinder head was recast in aluminium. The early cast iron cylinder heads are prone to damage by frost, and this is a point that should be checked when contemplating purchasing a pre-1928 model. The Phantom 1 was also manufactured by Rolls-Royce Ltd., Springfield, Massachusetts. The following chassis numbers and letters are a foolproof guide to the actual year of manufacture of each chassis, independent of the date that the car was first registered.

1925 - MC, RC, HC. 1925/26 - LC.
1926 - FL, (U.S.A.), SC, DC, TC, YC.
1926/27 - NC.
1927 - RM, PM, FM, (U.S.A.), EF, LF, RF, UF.
1928 - PP, KP, (U.S.A.), FP, EH, FH, AL.
1928/29 - CL, WR.
1929 - LB, (U.S.A.), KR (101 - 300 U.S.A.), OR.
1930 - MR, (U.S.A.).
1931 - PR, (U.S.A.).

In 1922 a smaller Rolls-Royce was introduced of 3,127 c.c. capacity, using six cylinders, and a 129 in. wheelbase chassis, which sold without bodywork for £1,100. The original model of the Rolls-Royce "Twenty" as it was called, had a three speed gearbox with central gearchange, but in 1925 a four speed gearbox was introduced with a right hand gearchange. Also in 1925 well base wheels and hydraulic shock dampers on the front springs were introduced. In 1924 an additional magneto was fitted as a reserve in case the ignition system should fail. The chassis continued in this form with only minor modifications till 1928 when hydraulic shock absorbers were fitted at the rear, and a year later the radiator shutters were changed from horizontal to vertical positioning. Also in this year the lubrication of the chassis

was partially centralised. A total of 2,890 chassis were made, and can be identified by the following letters and numbers.

1922/23 - 40GI - 50GO.
1923 - 50SI - 60SO, 60HI- 70HO, 70AI - 80AO, 80KI - 90KO, GA.
1924 - GH, GAK, GMK, GRK.
1924/25 - GDK.
1925 - GLK, GNK, GPK.
1925/26 - GSK.
1926 - GCK, GOK, GZK, GUK, GYK.
1926/27 - GMJ.
1927 - GHJ, GAJ, GRJ, GUJ.
1927/28 - GXL.
1928 - GYL, GWL, GBM, GKM, GTM.
1928/29 - GFF.
1929 - GLN, GEN, GVO, GXO.

1929 saw the introduction of the Phantom II, and this utilised a slightly modified version of the Phantom I engine, but an entirely new chassis, built to two lengths. The short chassis (144 in.) cost £1,850 and the long chassis £1,900. In 1934 Rolls-Royce began selling complete cars though the bodywork was still built by individual coachbuilding firms. A complete Rolls-Royce with bodywork cost between £2,600 and £2,800 depending on the style chosen. The most important modification was the introduction of syncromesh to the gearbox in 1932, and this operated between second and third, and third and fourth gears. Other alterations that were made were thermostatically controlled shutters in 1931, a semi-expanding carburettor, and a high lift camshaft late in 1933, from chassis No. 103 MY. A return was made to the low lift camshaft from chassis ITA in 1934. A total of 1,770 cars were made and the following chassis numbers give the year of manufacture.

1929/30 - WJ, XJ.
1930 - GN, GY.
1931 - GX.
1931/32 - JS.
1932 - MS.
1932/34 - AMS.

1933/34 - AMS.
1933 - MY.
1933/34 - PY.
1934 - RY, SK.
1934/35 - TA.
1935 - UK.

Following on from the Phantom II came the Phantom III in 1936, and this is regarded by many as the best of all Rolls-Royce cars. Certainly it was not till the introduction of this model that Rolls-Royce designed a chassis that was as smooth and silent running as the original Ghost. With its V.12 engine, hydraulic tappets, exceptional silence, high performance and outstanding roadholding, it was the epitome of all that was best in automobile engineering practise. The complete car cost about £2,900 depending on the coachwork, or £1,900 in chassis form. Capable of over 100 m.p.h. and with the ability to cruise all day at 85 m.p.h. the car was at its best on long, fast journeys. Various modifications were introduced from time to time, the first of which concerned the repositioning of the petrol pumps on the bulkhead, as in this position vapour locks occured when the under-bonnet temperature rose. Rolls-Royce dispatched a circular to all registered owners when this was discovered, and on most models the pumps have been repositioned in the chassis. It is a sign that neglect set in early in the cars life if the pumps have not been repositioned. The design then went practically unaltered till the DL series, introduced in 1939. A new cylinder head, metal big ends, and solid tappets were introduced on this series, and an overdrive gearbox from 3DL 172.

From chassis number 3CM35 the petrol pumps were repositioned in the frame. A total of 715 chassis were made of this model, and they can be recognised by the following letters and numbers.

1936 - 3AZ, 3AX.
1936/37 - 3BU.
1937 - 3BT, 3CP.
1937/38 - 3CM.
1938 - 3DL
1939 - 3DM.

Meanwhile what of the smaller Rolls-Royce? In 1929 the "Twenty" was superseded by the 20/25, which made use of a six cylinder engine of 3,669 c.c. capacity with a bore and stroke of 3¼ in. by 4½in. The 129 in. wheelbase chassis cost £1,185 without coachwork, and a number of modifications were made, the most important of which was the introduction of a synchromesh gearbox from chassis number GKT 22, manufactured in 1932. Also in this year the radiator shutters were changed from manual to thermostatic control. From chassis number GYD 25 it was possible to adjust the setting of the shock absorbers to cater for both town and country running. A total of 3,792 chassis were made and utilised the following letters and numbers.

1929 - GXO.
1929/30 - GGP.
1930 - GDP, GWP, GLR, GSR, GTR.
1930/31 - GNS.
1931 - GOS, GPS.
1931/32 - GBT.
1932 - GKT, GAU, GMU, GZU, GHW.
1932/33 - GRW.
1933 - GAW, GEX, GWX, GDX, GSY, GLZ, GTX, GYZ, GBA, GGA, GHA.
1933/34 - GXB.
1934 - GUB, GLB, GNC, GRC, GKC, GED, GMD, GYD, GAE, GWE, GFE, GAF.
1934/35 - GSF.
1935 - GRF, GLF, GPG, GHG, GYH, GOH, GEH, GBJ, GLI, GCI.
1935/36 - GXK.
1936 - GBK, GTK.

In 1936 the 20/25 was superseded by the 25/30, which made use of an overbored version of the 20/25 engine giving 4,257 c.c. The chassis was of 132 in. wheelbase, and cost £1,100. No modifications were made to these cars, and apart from the increase in engine capacity they were practically identical to the 20/25 model. A total of 1,200 chassis were made, and they can be identified by the following letters and numbers. The Wraith was introduced at the end of 1938.

1936/37 - GUL, GTL, GHL, GRM, GXM, GGM, GAN, GWN.

1937 - GUN, GRO, GHO, GMO, GRP, GMP, GLP.
1937/38 - GAR,
1938 - GGR, GZR.

In all a total of 12,617 cars were made of the models manufactured between the 1922 Rolls-Royce 20, and the 1939 Phantom III.

CHAPTER 2

Starting Instructions - Engine and Chassis Specifications - General Maintenance and Servicing Information for all Rolls-Royce 20 models.

An experienced driver will not find a Rolls-Royce 20, in good condition, a difficult car to drive, but it can cause trouble to the novice because of the lack of synchromesh in the gearbox, and the various ignition and carburation controls that have to be correctly manipulated and set before the car will run properly.

When starting the car the following procedure should be used:- After making certain that the gear lever is in neutral and that the hand brake is on, close the radiator shutters by moving the control lever on the instrument board. Then retard the ignition control, and close the throttle. Switch on the ignition by moving the right hand thumb lever on the switch box to the position marked I (Ignition). Open the starting carburettor by pushing the lever on the instrument board to the position marked "Starting" or "On". The carburettor mixture control must then be set to "strong".

The starter pedal can now be pressed, when the engine should fire almost immediately. As soon as the engine is running, move the throttle control lever on the steering column about half way up the quadrant, and turn back the starter carburettor control lever to the position marked "Off". Allow the engine to warm up for a minute or two, and then set the mixture control half way between the positions marked "strong" and "weak". When driving the car after it has warmed up, the ignition should be advanced about $\frac{3}{4}$ of its quadrant. When gear-changing it is necessary to pause for a second or two in neutral when changing up, and to double-declutch when changing down.

Once the engine has reached its normal working temperature of between 70°C and 90°C the oil pressure should remain

steady, at all speeds, between 15 to 20 lbs. per sq. in.

The engine of the Rolls-Royce 20 is of six cylinders with overhead valves with a bore of 3 in. and a stroke of $4\frac{1}{2}$ in. giving a total cubic capacity of 3,127 c.c. The cylinder block is a monobloc casting with a detachable cylinder head. The crankcase and the gearbox are in unit construction and it is not possible to separate them. Three point suspension mounting is used. The valves are pushrod, operated from the camshaft, and they are situated in the cylinder head. There are two valves per cylinder.

Rolls-Royce battery coil ignition is fitted with partial automatic advance for the distributor. A Magneto that can be coupled up quickly is provided as a standby. The lubrication system is by pressure to all main bearings. A Rolls-Royce automatic expanding carburettor is fitted.

The electrical equipment consists of a 12 volt Rolls-Royce dynamo, starter motor and other units. A 50 amp. hour battery is fitted as standard. A single dry plate clutch transmits the torque from the engine to the gearbox.

The gearbox has four forward speeds and one reverse. The actual gearchange lever is located on the right hand side of the driver and is very light to operate. The speedometer and brake servo motor are also driven from the gearbox.

The spiral bevel rear axle is fully floating, and the road wheels are entirely carried on the axle tubes. Internal expanding brakes are fitted on all four wheels, and are servo operated. The rear wheels only are affected by application of the hand brake.

Dunlop detachable well base wire wheels are fitted with Dunlop cord wired type tyres, the size being $5\frac{1}{4}$ in. for a 21 in. rim.

The specially braced chassis is made from high quality steel, and has a wheelbase of 129 in. and a track of 56 in. The chassis complete with tyres, petrol, battery, oil and

water, but excluding the spare wheel, lamps and other accessories, weighs approximately 2,530 lbs.

The petrol tank is of fourteen gallons capacity and is located at the rear of the chassis. Petrol is fed to the carburettor by means of a vacuum created in the inlet manifold.

As the chassis is not fitted with the Rolls-Royce automatic oiling system, it requires frequent attention if it is to be kept in good condition, and adequately lubricated. The following points should receive attention every 500 miles, in the manner indicated:-

LUBRICATION ROLLS-ROYCE 20

Every 500 miles

Gear oil should be applied to the following items with the specially provided oil gun.

Front Spring Shackles.
Rear ends of Front Springs.
Cross Steering Tube (both ends).
Side Steering Tube (both ends).
Front shock damper connections.
Steering pivots.
Universal joints at both ends of propeller shaft.
Forward ends of Rear Spring.
Rear Spring Shackles.

Also at this mileage grease should be applied to the lubricating cap on the water pump, and the level of acid in the battery inspected.

Every 1,000 miles

Engine oil should be applied to the following parts with the exception of the items marked thus * which should be lubricated with gear oil.

Brake cam and lever shafts on axle*.

Brake connecting jaws under rear axle.
Jaws of brake ropes. (both front and rear).
Ball joints of front brake pull rods.
Jaws of brake rods between balancing lever equalisers (front and rear).
Jaws of brake rod from servo to equaliser.
Joints of coupling rods from servo to balancing lever.
Fulcrums of brake actuating levers on servo shaft.
Servo shaft.
Servo engaging levers.
Fulcrum of balancing lever.
Joints of links between cross shaft and servo
Jaws of road from pedal to cross shaft.
Bearings of pedal shaft.*
Clutch pedal connections.
Accelerator pedal.
Fulcrum of hand brake lever.*
Jaws of road from handbrake lever to equaliser.
Hand brake pawl connections.
Reverse catch of gear lever.
Cam of battery ignition contact breaker (smear of oil only)
Spring gaiters.

Every 2,000 miles.

Brake equalisers.*
Clutch trunnion.
Clutch levers.
Clutch withdrawing shaft.
Starter motor bearing.
Dynamo bearings.
Dynamo drive coupling.
Front engine support.*
Battery ignition governor.
Steering column.
Steering box.*
Control mechanisms for ignition etc.

Also every 2,000 miles the wheels should be removed, the interior "hubs" greased, and the wheels changed round

to equalise tyre wear. The steering joints and the shock damper connections should be tested for play, and adjusted if necessary.

A lubrication chart showing the viscosity of oil that should be used on all items requiring lubrication is given at Appendix 2.

The original lubricants recommended by Rolls-Royce are as follows.

Engine. Price's Motorine "C" or Wakefield (Castrol) XL for both Summer and Winter use.

Gearbox. Price's Amber "A" with which should be mixed up to 10% of Price's Motorine "C" in cold weather or Wakefield's special gear "S" with which should be mixed up to 10% of Wakefield's XL in cold weather.

Rear Axle. Same as for gearbox.

Hydraulic Shock Absorbers. Castrol "F" only.

Ball Bearings. Hoffman ball bearing grease, manufactured by Alex Duckham & Co. Ltd.

The tappets should also be adjusted every 2,000 miles, the setting and method of adjustment being the same as for the Rolls-Royce 20/25. (See section on tappet adjustment in Chapter 3). The firing order is 1, 4, 2, 6, 3, 5; Cylinder No. 1 being the nearest to the radiator.

If it is wished to adjust the brakes it should be noted that the only points in the system where any adjustment is provided for, or is necessary, are as follows.

a). Rear Brakes. The threaded rods coupled to the cam operating levers below the ends of the rear axle.

b). Front Brakes. A serrated adjustment on the cam operating shafts.

c). Servo. A serrated adjusting nut on the end of the servo shaft.

It is very important to ensure that under no circumstances should adjustment be attempted at any other points, for instance by altering the lengths of other brake rods, or any of the brake ropes. The actual method of adjusting the brakes is the same as for any car, i.e. each wheel jacked up in turn, the adjustment turned up till the wheel is tight, and then slackened back slightly, so the wheel runs freely.

CHAPTER 3

Starting Instructions - Engine and Chassis Specifications - General Maintenance and Servicing Information for all Rolls-Royce 20/25 models

The Rolls-Royce 20/25 is slightly more powerful than its predecessor, and has several important mechanical refinements. The most important of these is synchromesh between third and top gear, and a one shot chassis lubricating system.

The car is started in the following manner. First the fuel should be turned on by turning the fuel tap on the dashboard to "M" or main. There are two other positions for the tap but these will be given later. Next switch on the ignition by turning the right hand thumb lever on the switchboard to "I & C" (Ignition and charge). Check that the gearlever is in neutral, and that the handbrake is on. If starting for the first time in the day, and the engine is cold, set the thumb lever on the instrument board to "Start".

Fully retard the ignition and move the hand throttle half way up its quadrant. The starter button can now be depressed and the engine should fire almost immediately. If starting when the engine is warm, leave the thumb lever at "Normal" and set the hand throttle only a few notches up its quadrant. As soon as possible after the engine has started move the thumb lever to "Normal", and leave it there. The mixture control lever should only be used when starting from cold. Normally it should stand at "Run". Once the engine has warmed up, the ignition can be advanced about three quarters of its travel.

To return to the fuel tap. This has three positions. "R" (Reserve $2\frac{1}{2}$ gallons), "O" (Off), and "M" (Main tank, the total capacity of which, including the reserve, is 18 gallons). When turning the tap to "R" it is necessary to depress a small catch. It should be noted that the fuel gauge is graduated to include the total amount in the main tank.

The specification of the car is as follows. The six cylinder engine is of 3,669 c.c. and has a R.A.C. rating of 25.3 h.p. It uses a stroke of $4\frac{1}{2}$ in. and a slightly wider bore than the 20, of $3\frac{1}{4}$ in. The engine and gearbox are again in unit construction. The cylinder block has a detachable head in which are housed the overhead valves which are operated by pushrods and rocker arms from the camshaft. Rolls-Royce coil ignition is provided, with both automatic and manual advance mechanism. A magneto that can be quickly coupled up should the coil ignition fail, is provided as a standby. A Rolls-Royce expanding carburettor is fitted, the cooling is by pump circulation, and the engine uses a forced lubrication system.

The electrical equipment is of Rolls-Royce manufacture, and includes a 12 volt dynamo, starter motor and other units. A 50 ampere hour battery is fitted.

Drive is transmitted to the gearbox via a single dry plate clutch, and the former unit has four forward speeds and reverse. On later models synchromesh was provided on all gears except first. The drives for the speedometer and the servo are taken from the gearbox. The rear axle is fully floating, is of the spiral bevel type, and the road wheels are carried on the axle tubes. The final drive ratio is 4.55 to 1 which gives the following overall ratios in different gears.

First gear	15.04 to 1
Second gear	9.41 to 1
Third gear	6.25 to 1
Fourth gear	4.55 to 1

A number of the earlier models manufactured round 1931 had slightly different gearing, though the same final drive ratio.

First gear	16.98 to 1
Second gear	10.62 to 1
Third gear	6.98 to 1
Fourth gear	4.55 to 1

The brakes were of the external expanding type and were servo assisted to all four wheels. The independant hand brake operates on the rear wheels only.

Semi-elliptic springs were fitted front and rear, and special hydraulic dampers. For comfortable riding at all speeds, a centrifugally controlled pump causes the damper loadings to increase as the speed of the car rises. An over-riding control is fitted on the steering wheel and is marked "Riding Control". This hand lever is best set at maximum for fast touring and road work, and at minimum for sedate town work.

Dunlop detachable well base wire wheels were fitted with Dunlop cord wired type tyres, 6 in. for a 19 in. rim.

The wheelbase was 132 in., and the track front and rear 56 5/16th. in. There was some difference between the right hand and left hand turning circles. The right hand turning circle was 47 ft. 5 in., while the left hand turning circle was 42 ft.

An eighteen gallon fuel tank was carried at the rear, and fed to the carburettor by means of a vacuum. The chassis, complete with tyres, battery, fuel, oil and water, but excluding the spare wheel, lamps and other accessories weighed approximately 2,915 lbs. The servo is of the dry disc clutch type and should run at least 20,000 miles without the need of any adjustment.

The cylinders fire in the following order - 1, 4, 2, 6, 3, 5, No. 1 being the cylinder nearest the radiator.

The oil level indicator for the sump can be found on the lower half of the crankcase and consists of a small pointer with a dial marked in fractions of a gallon. The pointer is operated by a float inside the crankcase, and the amount of oil in the sump should be maintained at 1¼ gallons.

The oil pressure should never fall below 7 lbs. per sq.in. and the normal pressure is between 15 to 20 lbs. per sq. in.

A foot operated pump and oil reservoir is located on the front of the dashboard, and supplies oil under pressure for all chassis lubrication. When starting the engine from cold for the first time in the day, depress the oil pump once. When running the pump should be operated once every 100 miles. The oil reservoir will require refilling every 2,500 miles.

Rolls-Royce recommend the following lubricants for use in the 20/25.

Engine. Castrol XXL Summer, Castrol XL Winter.
Gearbox. Same as for engine.
Rear Axle and Steering Box. Price's Amber "A" Gear Oil
Universal Joints. Vacuum Mobilgrease No. 2.
Chassis Oil Pump. Castrol XXL.
Hydraulic Shock Dampers. Wakefield Castrol F.
If it is wished to use a different brand of lubricant the correct viscosity is given at Appendix 2.

Every 2,500 miles the following points require attention in the manner indicated.

Dynamo and Starter Motor Bearings. Inject two or three drops of engine oil with the oil can, into the lubricators, one of which is on the starter motor and the other on the dynamo. Do not inject more than the recommended amount.
Battery Ignition Governor. Inject a few drops of engine oil with the oil can into the spring lid lubricator.
Water Pump Bearing and Gland. When the engine has been running and is warm, remove the lubricator cap, fill 1/3rd. full of grease, and then screw it right down.
Cam of Battery Ignition Contact Breaker. Smear a trace only of grease on the cam surface. Again it is most important not to overlubricate.
Steering Box. Remove the plug, and fill the box with gear oil to the mouth of the plug orifice.
Valve Tappet Clearances. The valve tappet clearances should be set when the engine is cold to 0.003 in. for both inlet and exhaust valves. The valve tappets are set with adjustable heads, access to which is obtained by removing the

two covers on the left hand side of the engine. The tappet head is screwed into the tappet, and is locked with a nut. When this nut is released the tappet can be screwed in or out, as may be desired. Before adjusting, it should be ascertained that that particular tappet roller is well away from the cam. This is best done by turning the crankshaft by hand until the valve has opened and closed, and then cranking round half a revolution beyond this point.

The following items require attention every 5,000 miles.

Guide of Carburettor Air Valve. Open the lubricator and inject one or two drops of thin oil into the small lubricator on the side of the carburettor. Close the lubricator.
Clutch Shaft and Levers. First remove the clutch pit cover, and then turn the withdrawal sleeve with the fingers until the slot is at the top. Next turn the crankshaft until the oil hole is visible. A few drops of engine oil can now be injected. Be careful not to overlubricate as an excess of engine oil will cause clutch trouble.
Fan. Open the lubricator and inject a few drops of engine oil. Close the lubricator.
Servo Bearing. Inject one or two drops of engine oil with the oil can into the spring lid lubricator.
Gearbox. Inspect the oil level by means of the dipstick and replenish if necessary.
Rear Axle. The oil level should be inspected when the axle is warm, by removing the overflow plug on the rear off side of the casing. If the level is low, warm the fresh gear oil thoroughly and add it through the filler plug hole at the top of the casing.
All brake connection jaws and links should also be lubricated, and the control mechanisms to the engine such as the carburettor and accelerator linkages should be oiled.

Every 5,000 miles the engine oil should be drained, and the engine oil strainer cleaned. Drain the engine oil when it is hot. The oil strainer is carried in the bottom of the lower half of the crankcase. It can be removed by unscrewing the six nuts which hold it in position. Remove the gauze and carefully clean it in paraffin or petrol.

Fuel Filter. Remove and clean the fuel filter.
Air Cleaner. Remove the cleaner element and wash it out in petrol or paraffin.
Fuel Tank. Release the drain plug at the bottom of the main tank to allow any accumulated water or sediment to escape.
Sparking Plugs. Remove the sparking plugs and set the gaps to 0.020 in.
Fuel Strainer on Carburettor. A very fine gauze fuel strainer is arranged in the fuel inlet pipe to the bottom of the float chamber. This can be removed by unscrewing the retaining screw, and the gauze must be thoroughly cleaned at least once every 5,000 miles.

Every 10,000 miles the following points call for attention.

Hydraulic Shock Dampers. Inspect oil level and add more oil if necessary.
Hydraulic Shock Damper Control. The oil level in the hydraulic shock damper control can be inspected by removing the plug from the filler spout.
Universal Joint. First remove the air release plugs. Then turn the propellor shaft so that the lubricators for the universal joints are at the bottom, and the air release aperture ersal joint are at the bottom, and the air release apertures at the top. Inject grease with the grease gun, and replace the plugs.

Every 20,000 miles the following items must be attended to.

Gearbox and Rear Axle. Drain out all the oil when both are warm and refill with fresh oil.
Chassis lubrication System. Remove and discard the three felt strainer pads located, respectively, one at the base of the chassis oil pump, and one at each end of the front axle. Replace with new pads.

Should it become necessary to adjust the brakes the only points in the system where any adjustment is provided for or is necessary are as follows.

a). Footbrake - Front and Rear. A wing nut adjustment

which is for hand operation only.

b). Hand Brake. The threaded rods coupled to the cam operating levers below the rear axle.

c). Servo. The serrated adjusting nut on the end of the Servo shaft. No adjustment should be attempted at any other points.

When adjusting the wing nuts of the front and rear brakes only the fingers should be used for turning them. They are formed with cam shaped bosses bearing on cylindrical trunnions in such a way that rotation of the nuts through 90° from the normal position causes the brake shoes to be moved towards the drum as the cams ride over the trunnion. This movement is carefully predetermined and is equal to the normal clearance between shoes and drum when the shoes are in the "off" position.

Screwing on the nut through a further 90°, that is a total of half a turn, allows the shoes to return to the "off" position which is half a turn of the adjustment nearer to the drum. The adjustment is self-locking.

The actual method of adjusting the brakes is perfectly straightforward and can be performed in the following manner. Jack up each wheel that is to be adjusted, and screw up each respective wing nut till the wheel locks. Then slacken the nut back a quarter of a turn.

CHAPTER 4

Starting Instructions - Engine and Chassis Specifications - General Maintenance and Servicing Information for all Rolls-Royce 25/30 models

The original Rolls-Royce 25/30, introduced in 1936, was identical to the 20/25 with the exception that the bore of the engine was increased from $3\frac{1}{4}$ in. to $3\frac{1}{2}$ in. to give cubic capacity of 4,257 c.c. Starting instructions, the engine and chassis specifications and the general maintenance and servicing data are therefore identical to the information in Chapter 3.

In 1938 the specification of the Rolls-Royce 25/30 was radically changed by the adoption of a specially cross braced chassis and independent front suspension. This model became known as the "Wraith". It is not possible to give maintenance and servicing information for this model but the Rolls-Royce engine and chassis specification was as follows.

The six-cylinder overhead valve engine had a bore of $3\frac{1}{2}$ in. and a stroke of $4\frac{1}{2}$ in. The cylinder block is a monobloc casting with detachable cylinder head, the crankcase, sump and clutch housing being made of a special Rolls-Royce aluminium alloy to ensure lightness, in compatability with strength. The valves are pushrod operated from the camshaft, which runs in seven bearing in the crankcase. There are two valves per cylinder.

The seven bearing crankshaft is balanced statically and dynamically to within very fine limits; a spring loaded damper is fitted to the front of the shaft, ensuring great smoothness of running, and reduced wear of crankshaft journals and bearings. The big end bearings are in a new Rolls-Royce bearing alloy, which has a much bigger load capacity than ordinary whitemetal.

An important point in the suppression of noise is the Rolls-Royce patent design of piston - a product of years of research.

Ignition by battery and coil is provided, the ignition timing being controlled automatically by a centrifugal governor incorporated beneath the distributor head. A carburettor of the downdraught type with fixed jet is mounted on the induction pipe. An idle system with adjustable needle is embodied, ensuring reliable slow running of the engine, whilst an accelerating pump connected directly to the throttle gives rapid acceleration and flexibility at all speeds. The air intake and silencer of exclusive Rolls-Royce design, which is fitted to the carburettor, is of large proportions, and has been specially developed with a view to reducing to a minimum the sound made by the air entering the carburettor.

Lubrication is by a gear pump which delivers oil to the crankshaft and connecting rods at 25 to 30 lbs. pressure. This pressure is controlled by a dual spring loaded relief valve, one valve supplying oil to the high pressure system, the other at a lower pressure to the rocker mechanism. The cooling system incorporates a powerful centrifugal water pump, a fan of Rolls-Royce design to obtain silence with efficiency, and thermostatically operated radiator shutters. Special attention has been paid in the development of the 25/30 Wraith engine to secure adequate water passages in both the cylinder head and the block.

A feature, the result of long experimental work, is the latest Rolls-Royce engine mounting, whereby the engine is suspended at the front by means of a raised arch, which in conjunction with the rubber mounting at the rear effectively prevents engine tremors being transmitted to the passengers.

In order to obtain a standard of construction consistent with the other parts of the chassis, Rolls-Royce Ltd., design and make throughout, at their works many electrical components fitted to their cars; this includes the 12 volt dynamo, of the constant voltage type, the charging output of which is automatically controlled according to the state of the battery.

Each Rolls-Royce starter motor is subjected to rigorous testing on the bench before being fitted to the engine in order

to ensure that it is in every way adequate for the work for which it is intended. The 60 ampere hour battery is specially constructed for Rolls-Royce Ltd., to their specification.

The clutch is of the single dry plate type. The perfection of operation which has been obtained will be instantly observed by anyone taking a trial run in one of these cars.

Long life and silence, two features so inalienably connected with the name of Rolls-Royce, are built into the latest four speed gearbox, in which is included the simplified gear-change afforded by the use of synchronising cones on all forward gears, except 1st, which are positive in operation. Such is the ease of gearchanging with this design that any further departure from the orthodox gearbox is felt to be unwarranted. A right hand gear lever fully isolated from the engine is employed, and is placed so as to cause no obstruction when the driver enters or leaves the car.

The propeller shaft universal joints are of all metal type, being totally enclosed and the trunnions are fitted with needle type roller bearings, in order to reduce wear to a minimum.

The rear axle is of the "full floating" type, the road wheels being mounted solely on extensions of the axle tubes so as to render it oil retaining.

The steering gear is of the worm and roller type, the worm engaging with a grooved roller carried at the end of the sector arm. Frictional losses are further reduced by the mounting of all moving parts on ball or roller bearings.

After long and careful development work, independent front wheel suspension has been adopted for the 25/30 h.p. Wraith chassis. It consists of horizontal coil springs enclosed in a casing which forms both spring housing and hydraulic shock absorber body. The stub axles are carried by four radius arms, set in a trailing angle. Needle roller bearings are used throughout the front suspension. With this system exceptional comfort has been obtained for both front and rear seat passengers without sacrificing stability.

An outstanding feature of the car is in fact the way in which corners are taken without roll, and at high speeds a feeling of controlability is engendered, which normally is lacking where comfort is a primary consideration. This is largely due to the carefully arranged geometric layout of the suspension levers.

Semi-elliptic springs are used at the rear. To obtain the requisite degree of comfort, Rolls-Royce have found it necessary to accurately grind to size and fit together on its end bearing surfaces each leaf of the rear springs. The springs are encased in leather gaiters and are lubricated from the chassis lubrication system by means of holes drilled in the main leaves.

The hydraulic shock dampers are of patented Rolls-Royce design and manufacture, and as already mentioned the front units are incorporated in the spring housing. The degree of damping is automatically controlled by a patented governor device which controls the damper leading in accordance with the car speed. A special "over-riding" control is also fitted and is operated by a lever on top of the steering column to enable the loading of the shock dampers to be increased to the maximum, or to any intermediate setting at will. The inclusion of a stabilising torsion rod coupled to the shock damper arms makes for an even ride under all conditions.

With box section side members which are specially braced for strength, the 25/30 h.p. Wraith frame is the result of long experience on the part of Rolls-Royce Ltd., in frame construction, and incorporates many advanced features which have proved of intrinsic value.

One of the most noteworthy points of the Rolls-Royce chassis is the system of braking which is employed. A mechanical servo in the form of a friction disc clutch rotated by the transmission, and mounted on the side of the gearbox is used. When the brakes are applied the pedal pressure operates the rear shoes in the usual manner, and at the same time brings the servo into operation, thus applying the front

brakes. The pull from the servo is distributed between the front and rear brakes by a special "T" shaped balancing lever. A separate equaliser is provided for both pairs of front and rear brakes, to ensure even braking on both sides of the car. With this system, positive progressive braking is assured, with a light pedal pressure which gives passengers and driver alike a feeling of complete confidence.

The handbrake operates on the rear wheels, and is conveniently placed on the right of the driver, where it does not cause any obstruction when entering the driving seat from the offside.

A very complete arrangement for the lubrication of all important working parts is comprised in this system. A foot operated pump combined with an oil reservoir is located on the front of the dashboard. This supplies oil to a system of small bore brass pipes extending throughout the chassis. The distribution of oil injected is carefully adjusted to be adequate for the requirements of each particular joint.

An eighteen gallon petrol tank is provided at the rear of the chassis. Petrol is supplied to the carburettor by an electrically operated duplex fuel pump, which has been so placed inside the frame as to isolate it from engine and exhaust heat.

Permanently fitted lifting jacks are fitted to the front suspension and rear axle. These are of the hydraulic type and are controlled by a hand pump conveniently situated for operation from the front seat.

The road wheels are of the wire type with 17 in. well base rims. They are provided with self locking, knock off type hub nuts, which prevent any possibility of their working loose. The tyres supplied are Dunlop 6.50 in. by 17 in.

The leading dimensions of the chassis are as follows: Total length overall 203 in. Width of car 74 in. Wheelbase 136 in. Front track 58.5 in. Rear track 59.5 in.

CHAPTER 5

Starting Instructions - Engine and Chassis Specifications - General Maintenance and Servicing Information for Rolls-Royce Phantom I and II.

Although the engines that powered the Phantom I, and the Phantom II are basically the same, there are important differences between the two chassis, and for this reason a full description of each will be given in this chapter. Many enthusiasts consider that the "Silver Ghost" was the last truly refined and silent running chassis before the introduction of the Phantom III, but this is largely a matter of personal opinion.

Starting instructions for both the Phantom I and II are basically the same and are as follows:

After ascertaining that the handbrake is on, the gear lever should be placed in neutral and the petrol turned on. The radiator shutters should then be closed by means of the central lever on the instrument board. Switch on both ignitions by moving the right hand thumb lever on the switch-box to the position marked "M, B & C". (Magnete, Battery and charge). Set the mixture control lever to strong, and fully retard the ignition. Then close the throttle. The throttle is closed, and the ignition retarded by moving the ignition and throttle levers to the bottom of their quadrants. A small high velocity carburettor is provided on the induction pipe for starting purposes only, being controlled by a small lever on the instrument board. Turn the lever to the "Starting" position. Now press the button switch on the dashboard when the engine should fire immediately. When the engine starts open the main throttle by moving the governor lever about a third up its quadrant. Then turn the starting carburettor back to the position marked "Running". After starting, advance the ignition through about 7/8th. of its range.

Allow the engine to run for a few minutes so that the oil

circulates properly and the unit is given a chance to warm up. As soon as the engine is warm, set the mixture control in the middle of its quadrant.

If the engine is very cold, start it by hand to avoid a heavy discharge from the battery. The starting handle can be located in the tool kit. After use it is important to remember to remove it from the bracket and return it to its proper place of storage, otherwise it may drop out on the road and be lost.

The radiator shutters should be kept closed till the water temperature reaches at least 70°C. The normal temperature range lies between 70°C. and 90°C. Whenever the engine is stopped shut the shutter to conserve the heat.

When stopping the car if it is going to be used again soon, switch off, with the governor throttle lever half way up its quadrant. Place the ignition lever in the fully retarded position. The engine can be started when warm without the use of the starter motor by turning the ignition switch to the "B" or "MB & C" position, and then by moving the ignition lever quickly from its "full advance" to its "full retard" position the engine can be made to fire and start. This is because as the coil is of the non trembler type, the movement of the ignition lever will result in a quick break of the low tension circuit and a spark in the cylinder which is on its firing stroke.

The following handling instructions are those that were officially recommended by Rolls - Royce Ltd. in their handbook on the 40/45 h.p. Phantom I.

It is best to start in second or third gear. It is only necessary to start in bottom gear on an incline. First move the governor lever a third up its quadrant, so that the engine is turning over at between 300 to 400 r.p.m. Then release the handbrake and the clutch but do not depress the accelerator. The governor will automatically open the throttle the required amount to make a smooth silent start. When changing up pause in neutral for a minute. A shorter pause can be

made at low speeds and when the engine is cold. Changing down requires double declutching. When climbing a hill do not allow the roadspeed to drop below 14 m.p.h. in top gear. Do not try to engage gear either with a stalled engine - stop and restart the engine as otherwise damage may be done to the gearbox.

The automatic ignition control is used in conjunction with the hand control. The vacuum petrol feed is from the main tank to the small service tank on the dashboard. The fuel flows by gravity to the carburettor. To cut off the feed to the float chamber there is a needle type stop valve fitted. To open it, it should be lifted and rotated clockwise. To shut it turn it in the opposite direction.

Should it become necessary to drain the water, the drain tap is situated below the water pump.

The specification of the engine and chassis of the Phantom I are as follows: The engine is of six cylinders with a bore of $4\frac{1}{4}$ in, and a stroke of $5\frac{1}{2}$ in. The cubic capacity of the engine is 7,668 c.c. The cylinders are cast in two groups of three, and the engine uses overhead valves actuated by pushrods. Rolls-Royce battery ignition synchronised with a magneto is used. A special Rolls-Royce expanding carburettor is utilised.

Rolls-Royce manufacture the dynamo and the starter motor and a specially constructed 75 ampere hour battery is fitted. A single dry plate clutch is fitted which is totally enclosed in a casing bolted to the crankcase.

A four speed gearbox with reverse is fitted, with the gear change lever on the right of the driver. The speedometer and servo drives are incorporated in this unit.

The propellor shaft is enclosed in a torque tube. The one universal joint is completely enclosed within the spherical torque tube anchorage. The rear axle has a spiral bevel drive and is fully floating.

Internal expanding brakes were fitted to all four wheels and were servo assisted. The independant hand brake operated on the rear wheels only. Semi-elliptic springs were fitted at the front and full cantilever at the rear.

The wheelbase for the long model was 149.7 in. and for the short model 143.2 in. The track at the front was 57 in. and 56 in. at the rear. An eighteen gallon petrol tank was mounted at the rear of the chassis. The chassis weighed approximately 4,000 lbs.

Two ignition plugs were provided in the crown of each combustion chamber. One was supplied from the high tension magneto, and the other from a special coil ignition of Rolls-Royce design. Both ignitions were synchronised and automatically controlled as regards timing.

Inspect the level of the engine oil in the crankcase daily, by raising the offside of the bonnet and viewing the level indicator which is located just below the dynamo. The red rim of the indicator should stand well up in the glass. i.e. There should be about one gallon of oil in the crankcase. The engine must not be run with less than $\frac{3}{4}$ of a gallon. Oil is added through the filler on the same side of the crankcase. No more oil should be added when the indicator reaches the top of the glass. The sump will then contain 10 pints of oil. Also check the water in the radiator and ensure that it is maintained half way up the return pipe.

The Phantom I should be serviced in the following manner once every 2,000 miles. Lubricate the following parts with engine oil. Normally oil must be applied to the lubricator by the oil gun but in some instances such as when lubricating the dynamo bearings the oil can should be used.
Servo Engaging Levers.
Servo Shaft.
Clutch Pedal Connections.
Accelerator Pedal Connections.
Hand Brake Pawl Connections.
Reverse Catch of Gear Lever.

Gear Lever Fulcrum.
Cam of Battery Ignition Contact Breaker.
Spring Gaiters.
Dynamo Bearings.
Magneto Bearings.
Ignition Governor.
Steering Column.
Clutch Trunnion.
Clutch Levers.
Clutch Withdrawing Shaft.
Front Spring Shackles.
Rear Ends of Front Springs.
Drag Link end Joints.
Track Rod end Joints.
Control Mechanisms on the Steering Wheel Boss.
Governor Connections.
Exhaust Throttle Control.
Radiator Shutter Control.
Starter Carburettor Control and Exhaust Cut Out Control.

The following should be lubricated with gear oil at least once every 2,000 miles, or monthly, whichever is sooner.
Front and Rear Brake Countershafts.
Bearings on Pedal Shaft.
Fulcrum of Hand Brake Lever.
Bearing of Gear Lever.
Radiator Suspension Points.
Front Engine Support.
Steering Box.
Clutch Coupling Sleeve Between Engine and Gear Box.
Hand Brake Equaliser Shaft.
Brake Equalisers.
Torque Tube.
Starter Motor Reduction Gears.

It is most important that the chassis is lubricated regularly as only in this way will it be possible to eliminate all squeaks and rattles. The oiling of the chassis is greatly facilitated by the provision of the oil gun type lubricators, an oil gun being supplied in the tool kit. Rolls-Royce originally recommended the following lubricants:

Price's Motorine "C" for the engine.
Price's Amber "A" in the gear box and rear axle.
Hoffman Ball bearing grease manufactured by A. Duckham & Co. Ltd., for all ball bearings and wheelhubs.

Also every 2,000 miles

1. Drain oil and clean out the engine filter.
2. Check the oil level in the rear axle and the gearbox.
3. Grease the wheelbearings.
4. Test the steering joints and front shock absorber connections for play and adjust if necessary.
5. Inspect the L.T. "make and break" contacts of the battery ignition and clean if necessary. Set the gaps to 0.017 in. to 0.021 in.
6. Remove and clean the carburettor air valve and chamber.
7. Check tappet clearances with 0.003 in. feeler gauge when the engine is cold.
8. Remove and clean the sparking plugs. Set the gaps to 0.020 in. for the magneto and 0.03 in. for the battery. (The high tension leads are marked "M" and "B" respectively).
9. Adjust brakes if necessary.
10. Test the fan belt for tightness and adjust if necessary.
11. Inspect the contacts of the automatic cut out in the distributor box on the front of the dash. Clean with fine glass paper, and smear with a very little vaseline.
12. Remove the dynamo and starter moter end covers, clear away any dust and inspect the brush gear.

Every 5,000 miles the following items should be given attention:

Wheel Bearings - Remove the small screw from the centre of each road wheel hub, and inject a few drops of gear oil.

Carburettor Float Chamber - Unscrew the float chamber cover. Take the float out, and wipe the chamber clean with a piece of clean damp wash leather. Shake the float to see that no petrol has leaked into it.

Petrol Filter - The filter in the float chamber and vacuum tank should be removed and cleaned.

Fan - Give the lubricator on the fan bracket four turns of the oil gun. Lubricate the joints of the spring tensioning device with the oil can.

Front Shock Absorbers - Disconnect the front shock absorber links by unscrewing the two small bolts at the upper end after removing the gaiter. The central adjusting nut of the shock absorbers should be unscrewed and the leathers removed. These must be cleaned and then soaked in engine oil for 12 hours. Adjust the shock absorbers so that a weight of 25 to 30 lbs. may be suspended on the end of the lever without causing slip.

Every 10,000 miles

1. Drain and refill the rear axle and gearbox.
2. Remove the pipe that connects the carburettor air inlet to the crankcase and clean the gauze.

The final drive ratio for the Phantom II is 3.41 to 1 which gives the following overall ratios in the indirect gears:

First gear	11.90 to 1
Second gear	6.77 to 1
Third gear	4.55 to 1
Fourth gear	3.41 to 1

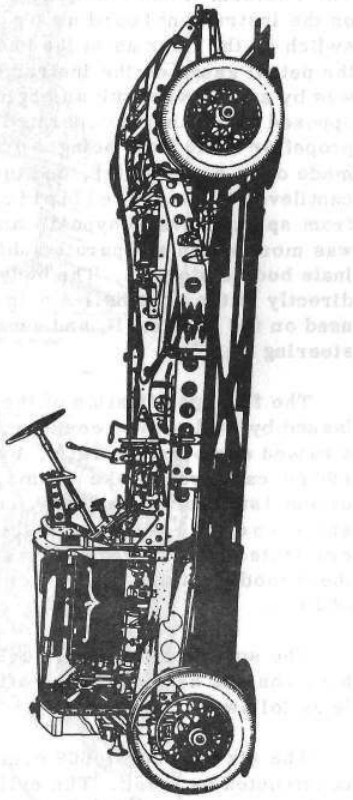
The final drive ratio for the Phantom I is 3.72 to 1 which gives the following overall ratios in the different gears:

First gear	12.60 to 1
Second gear	8.25 to 1
Third gear	5.52 to 1
Fourth gear	3.72 to 1

In general these servicing and maintenance instructions also apply to the Phantom II, with the exception that chassis lubrication is centralised, and there is no need to lubricate each part with the oil gun.

The main differences between the Phantom I and the Phantom II are as follows: The engine and gearbox on the former were in unit construction, whereas on the latter

Chassis



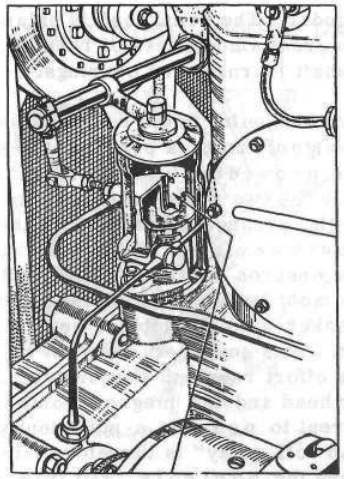
model they were individual separate units. The inlet manifold was heated by the exhaust on the Phantom I but is heated by the engine cooling water on the Phantom II. On the former the starter motor turned the engine over by a chain driven by gears, and the petrol gauge was located on the petrol tank. The Phantom II had a sequence starter operated by a switch on the instrument board as opposed to having the starter switch on the floor as in the Phantom I. The Phantom II had the petrol gauge on the instrument panel and the petrol feed was by an Autovac with an engine driven vacuum pump, as opposed to an Autovac operated by induction vacuum. The propellor shaft from being enclosed in a torque tube was made open and lighter, and the rear springs changed from cantilever to semi-elliptic. The rear axle was changed from spiral drive to hypoid, and the body on the Phantom II was mounted on a separate subframe, which helped to eliminate body distortion. The body on the Phantom I was bolted directly to the chassis. An improved ignition system was used on the Phantom II, and a more comfortable thin rimmed steering wheel.

The full specification of the Rolls-Royce Phantom II, as issued by Rolls-Royce contained many other changes such as a raised compression ratio, hydraulic shock dampers, new ribbed cast iron brake drums, synchromesh on all gears except 1st, thermostatically controlled radiator shutters, and a special oil pump in the starting carburettor to help eradicate cylinder wear when starting from cold. Some of these modifications were not introduced till the latter half of 1933.

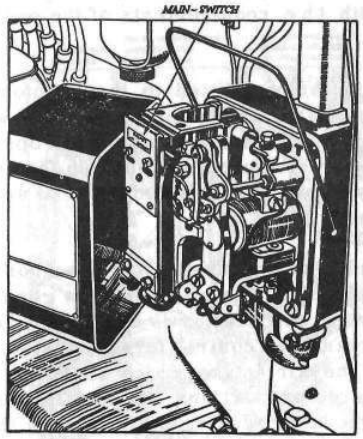
The specification of the Rolls-Royce Phantom II 40/50 h.p. chassis as given in the official Rolls-Royce catalogue is as follows:

The six cylinder 7,668 c.c. engine and the gearbox are constructed as a unit. The cylinders are cast in two groups of three with a detachable aluminium head. The overhead valves are operated by a camshaft mounted in the crankcase, through the medium of pushrods and rockers. There are two

ENGINE DETAIL "PHANTOM II"



ENGINE-DRIVEN VACUUM PUMP OPERATING AUTOVAC



Magnetic Starting Switch

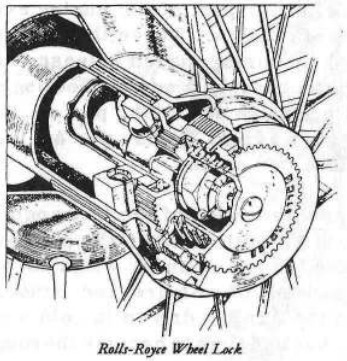
valves per cylinder. The crankshaft is balanced in a special manner to give great smoothness of running, also to reduce wear of crankshaft journals and bearings.

An important point in the suppression of noise is the Rolls-Royce design of piston, a product of years of research. Dual ignition is provided by battery and coil and also by magneto. While the two systems are quite independent of each other special arrangements are made to secure perfect synchronism between them and correct timing to suit all speeds. This ensures that pre-ignition will not take place even under the most severe conditions of operation. Beneath the contact breaker and distributor head is fitted a centrifugal governor. This governor does not act directly on the controls as the effort required to move simultaneously both the distributor head and the magneto contact breaker cover would be too great to permit a sufficiently high degree of sensitivity. An "oil relay" is therefore interposed between the governor and the controls. Oil from the main engine oil system is admitted to or released from the relay cylinder by a light valve controlled by the governor, and thus the oil pressure is made to operate the ignition control strictly in accordance with the requirements of the engine speed with imperceptible lag.

The carburettor now fitted to the Phantom II chassis is of a new design with a single jet which is known as a "semi-expanding" type. The induction depression operates a piston, the movement of which controls the main feed orifice so that the fuel supply is automatically adjusted to suit the requirements of the engine.

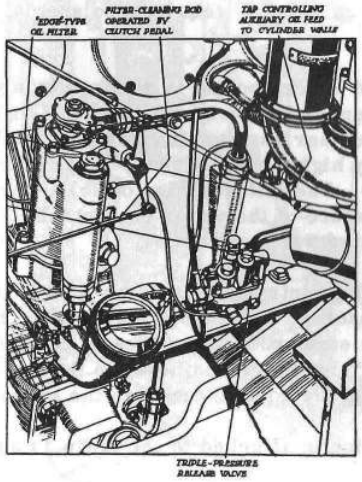
A small independent carburettor is embodied which is accurately adjusted to give reliable slow running of the engine. The starting carburettor is of special design, and is operated by means of a control lever mounted on the instrument board. The air intake which is fitted to this carburettor is of large proportions and has been specially developed with a view of reducing to a minimum the sound made by the air entering the carburettor. An air cleaner is incorporated.

ROLLS ROYCE - WHEEL LOCK



Rolls-Royce Wheel Lock

ENGINE DETAIL - PHANTOM II



Lubrication is by a gear pump driven by the engine. A noticeable feature of the oiling system is the use of three different oil pressures, thus ensuring that the lubrication requirements of every part of the engine are adequately met without excess of oil flow. These three pressures are simply obtained by spring loaded release valves arranged in series. Thus the crankshaft and connecting rod bearings are fed at the full pressure of 25 lbs. per sq. in. the overhead valve rocker shaft at $3\frac{1}{2}$ lbs. per sq. in., and the timing wheels at $1\frac{3}{4}$ lbs. per sq. in.

By the inter-connection of the lever controlling the starting carburettor with a tap in the main oil supply line an auxiliary oil feed to the cylinder walls is provided, thus eliminating any risk of seizure and consequent damage to pistons should the car be driven in cold weather before the oil circulation has had time to become thoroughly established.

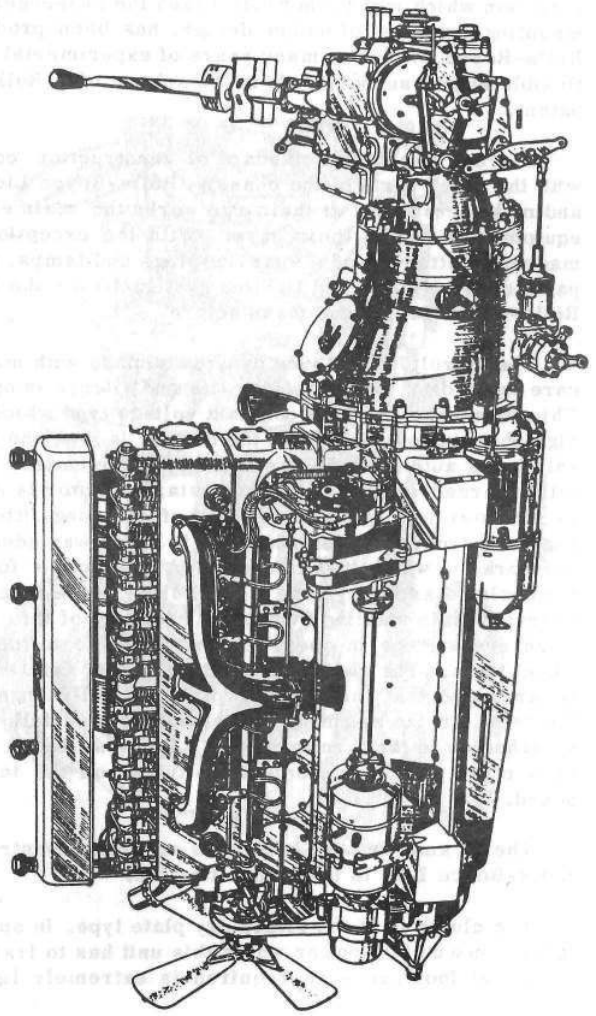
In order to secure the maximum life to the engine a self cleaning oil filter of the "edge" type is fitted. This filter is so arranged that the rotation of a spindle scrapes away any dirt collected on the filtering surfaces and deposits it in the base of the filter casing. As this filter is interconnected with the clutch pedal it requires no special manipulation by the driver.

Adequate water cooling is secured by a powerful centrifugal pump specially designed to avoid leakage and wear. Cooling is further assisted by a scientifically designed, and consequently highly efficient fan, which draws air through the radiator. The latter is also of Rolls-Royce construction. The temperature of the water is controlled by thermostatically operated water shutters.

The engine control mechanism repay a close examination. It will be observed that throughout only mechanically perfect motions are employed. As a result of this, after years of service, no "play" develops between the levers on the steering wheel and the control arms on the engine.

The engine is attached to the main frame by a pivoted

THE ROLLS-ROYCE 40-50 H.P. ENGINE



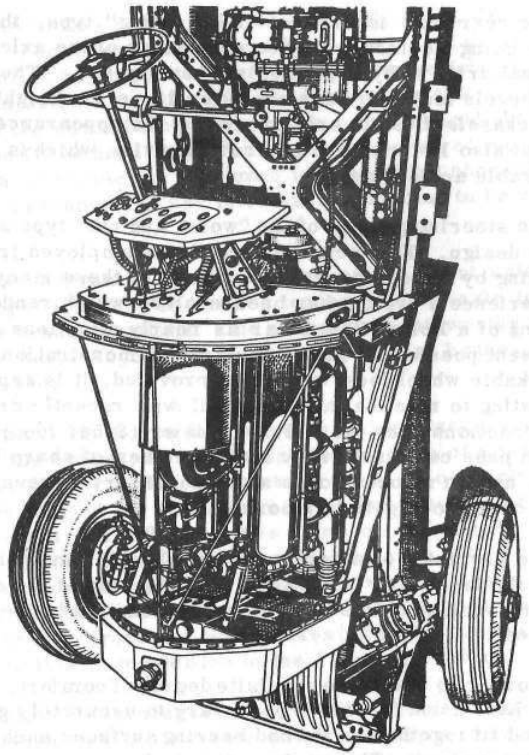
mounting, which is torsionally insulated by rubber from the chassis. The purpose of this arrangement is to absorb any vibration which might otherwise reach the passengers. The mounting, which is of unique design, has been produced by Rolls-Royce Ltd. after many years of experimental work on flexible engine supports. It is the subject of a Rolls-Royce patent.

In order to obtain a standard of construction consistent with the other parts of the chassis, Rolls-Royce Ltd. design and make throughout at their own works the main electrical equipment fitted to their cars. With the exception of the magneto, battery, leads, sparking plugs and lamps, all other parts of the ignition and lighting system bear the stamp of Rolls-Royce design and manufacture.

The 12 volt Rolls-Royce dynamo is made with meticulous care in order to secure long life and silence in operation. This dynamo is of the constant voltage type which gives a high charging output when the battery is low, the charging rate being automatically reduced as the battery becomes fully charged. Each Rolls-Royce starter motor is subjected to rigorous testing on the bench before being fitted to the engine in order to ensure that it is in every way adequate for the work for which it is intended. A distinctive feature of the engine starting system is the Rolls-Royce magnetically operated main starting switch. The object of this switch is to ensure silence in operation and long life to the starting wheel teeth. The electrical connections of this switch are so arranged that the starting pinion is fully engaged with the teeth on the engine flywheel before the full power is switched on to the turning motor. This switch is operated by a push button conveniently situated on the instrument board.

The 72 ampere hour battery is specially constructed for Rolls-Royce Ltd. to their specification.

The clutch is of the single dry plate type. In spite of the large amount of power which this unit has to transmit the degree of foot pressure required is extremely light. The



PHANTOM III

gearbox has four speeds and reverse and synchromesh on the upper three ratios.

The propeller shaft universal joints are of all metal type, being totally enclosed, and the trunnions are fitted with needle type roller bearings in order to reduce wear to a minimum.

The rear axle is of the "full floating" type, the road wheels being mounted solely on extensions of the axle tubes. The final drive is by hypoid spiral bevel gears. The use of these bevels makes it possible to reduce the height of the whole chassis thus not only improving the appearance of the car, but also lowering the centre of gravity, which is always a desirable achievement.

The steering gear is of the "worm and nut" type and is a unique design. This principle has been employed from the beginning by the company. As a result of these many years of experience a system has been evolved which renders the steering of a Rolls-Royce car as nearly effortless as it is at present possible to imagine. As a demonstration of the remarkable wheel lock which is provided, it is especially interesting to note that a Phantom II was recently driven in both directions over the Col de Golibier (8,540 feet). This French pass contains a very large number of sharp hairpin bends, and on no occasion was it necessary to reverse the car in order to negotiate a corner.

The provision of a spring loaded shackle pin at the rear end of the front spring on the steering side of the chassis prevents violent road shocks being transmitted to the steering wheel.

In order to obtain the requisite degree of comfort, Rolls-Royce Ltd. have found it necessary to accurately grind to size and fit together on its end bearing surfaces each leaf of the road springs. The springs themselves are encased in leather gaiters and by means of a special arrangement of oil holes and grooves in the leaves the ends of the three longest leaves of the spring are lubricated by surplus oil from the

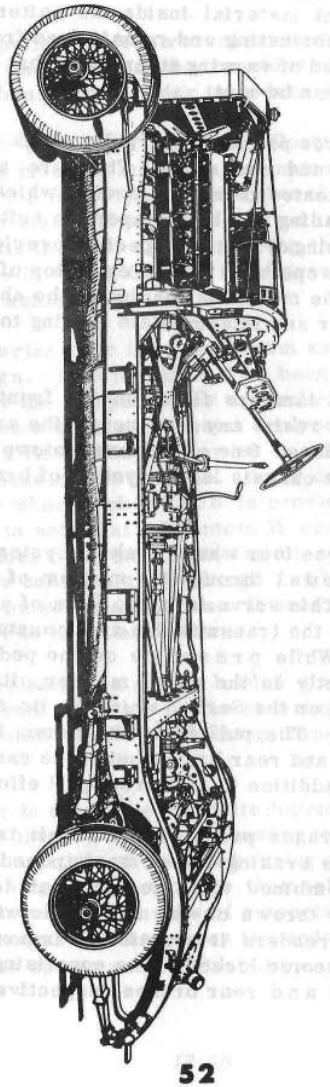
eye of the master leaf, which in turn receives oil from the chassis lubrication system. Owing to this arrangement and the use of absorbent material inside the gaiter the springs are entirely self lubricating and remain free from squeaks. Springs are supplied of varying strength so that the demands of each customer can be met.

The Rolls-Royce patented hydraulic shock dampers are fitted to both front and rear axles. They are automatically controlled by a patented governing device which automatically adjusts the loading of the dampers to suit the speed at which the car is being driven. A special "overiding" control is also fitted and is operated by a lever on top of the steering column to enable the maximum loading of the shock dampers to be increased, or any intermediate loading to be varied at will.

The hydraulic dampers fitted on the front axle are so arranged that they resist any tendency of the axle to twist under brake reactions. One of the most noteworthy features of the Rolls-Royce chassis is the system of brakes which is employed.

The Rolls-Royce four wheel braking system is operated from the brake pedal through the medium of a mechanical "servo-motor". This servo is in the form of a friction disc clutch rotated by the transmission and mounted on the side on the gearbox. While pressure on the pedal applies the rear brakes directly in the usual manner, it also engages the friction clutch on the Servo, which in its turn operates the front brakes. The pull from the Servo is distributed between the front and rear brakes but in the case of the rear brakes this is in addition to the direct pull effect.

With the leverages provided the result is that slightly less than half the braking power is imposed on the front wheels. This, combined with the fact that during braking greater weight is thrown on the front axle when the car is moving forward, renders it practically impossible for the front wheels to become locked. The equalising of the servo effort to the front and rear brakes respectively is effected



by a special "T" shape balancing lever. A separate Rolls-Royce type equaliser is provided for both pairs of front and rear brakes to ensure even braking on both sides of the car. A pneumatic damper is fitted in order to suppress any sound which the release of the Servo levers would otherwise produce.

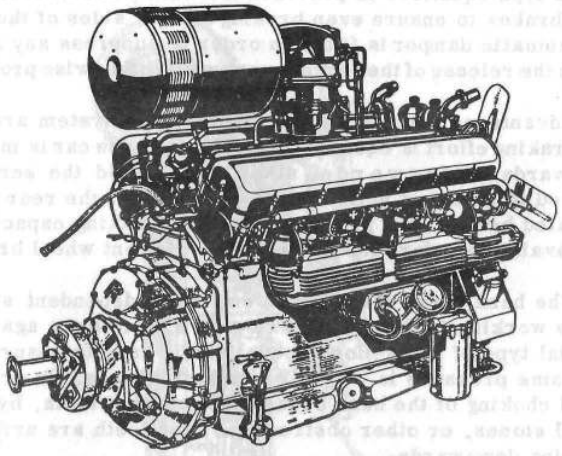
Advantages peculiar to the Rolls-Royce system are that the braking effort is equally available when the car is moving backwards or forwards, also, even should the servo be allowed to go out of action through neglect the rear pedal operated brakes still provide the same braking capacity as was available before the introduction of front wheel brakes.

The hand brake operates an entirely independent set of shoes working in the rear brake drums. Here again the special type of Rolls-Royce equaliser is used to ensure that the same pressure is applied to both wheels. In order to avoid choking of the hand brake lever ratchet teeth, by grit, small stones, or other obstructions, the teeth are arranged pointing downwards.

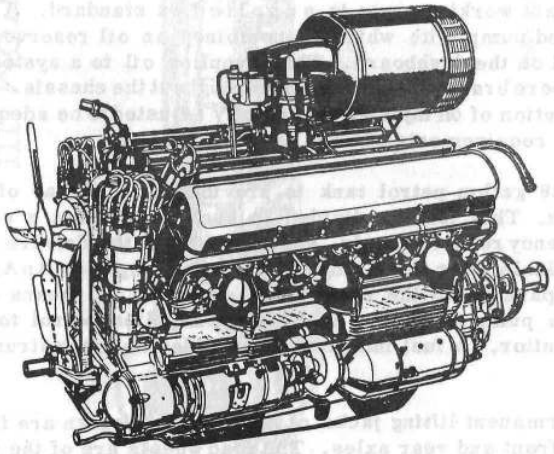
A very complete arrangement for the lubrication of all important working parts is supplied as standard. A foot operated pump with which is combined an oil reservoir, is located on the dashboard. This supplies oil to a system of small bore brass pipes extending throughout the chassis. The distribution of oil injected is carefully adjusted to be adequate for the requirements of each particular point.

A 28 gallon petrol tank is provided at the rear of the chassis. This tank is divided in such a way that a small emergency reserve supply, controlled from the drivers seat is available after the main tank has been emptied. An Auto-vac apparatus on the dashboard, operated by means of a vacuum pump driven by the engine, supplies petrol to the carburettor. A fuel indicator is provided on the instrument board.

Permanent lifting jacks of an approved design are fitted to the front and rear axles. The road wheels are of the wire type with 19 in. wellbase rims and are fitted with the Rolls-



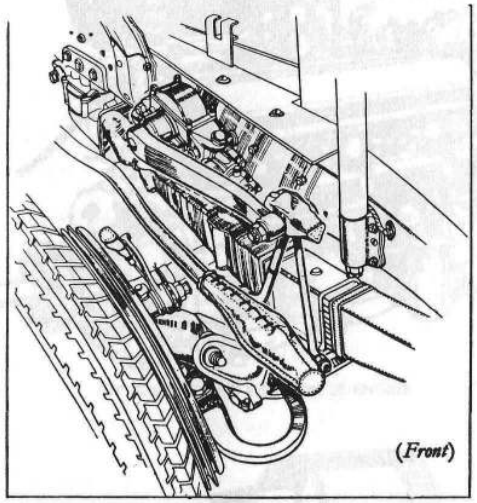
OFF SIDE VIEW OF PHANTOM III ENGINE

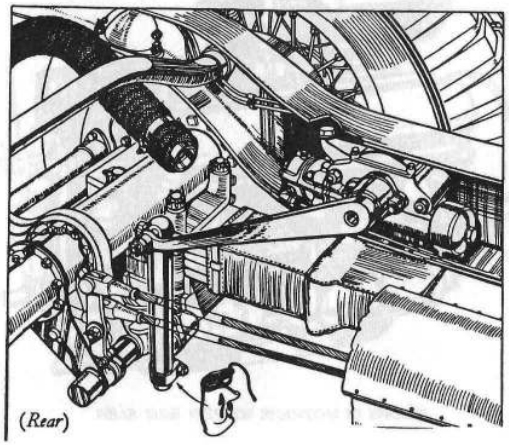


NEAR SIDE VIEW OF PHANTOM III ENGINE

Royce positive locking device which securely prevents them from working loose in service. The tyres are Dunlop 7.00 by 19. The total overall length of the chassis is 17 ft. 2 in. The wheelbase is 12 ft. 6 in., the front track is 4 ft. 10 $\frac{3}{4}$ in., and the rear track is 5 ft. 0 $\frac{1}{4}$ in.

ROLLS-ROYCE HYDRAULIC SHOCK DAMPERS





CHAPTER 6

The Rolls-Royce Phantom III

Many enthusiasts regard the Rolls-Royce Phantom III as the finest motor car ever manufactured, and certainly there is much to be said for this view as will be seen from the following authentic Rolls-Royce issued specification. As much of this specification is the same as for the Phantom II, only where it differs will it be reproduced.

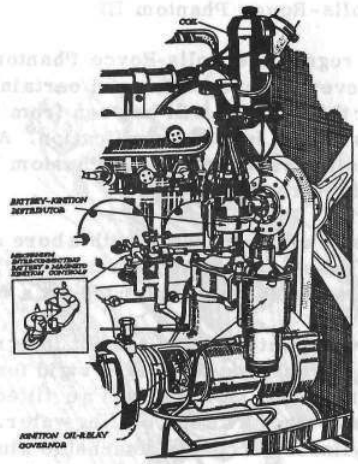
The engine consisted of 12 cylinders with a bore of $3\frac{1}{4}$ in. and a stroke of $4\frac{1}{2}$ in. and a total cubic capacity of 7,340 c.c. The cylinders were in two rows of six, arranged as a 60^{o} vee.

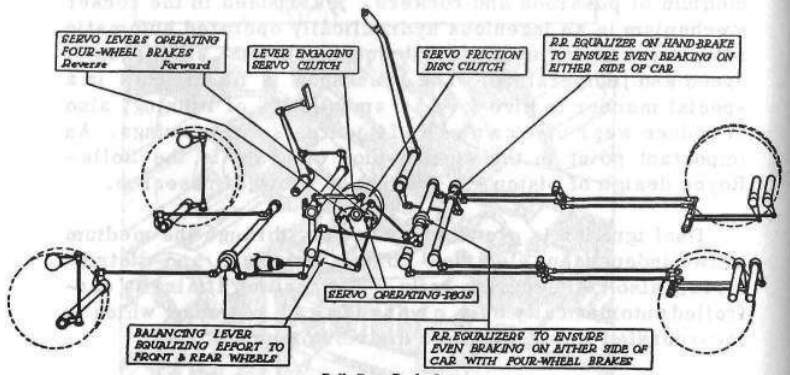
The cylinder shirt or water jacket is cast integral with the upper half of the crankcase forming a rigid foundation for the engine. Separate cast iron liners are fitted having their outer surface in contact with the cooling water. There are two valves per cylinder carried in detachable aluminium heads. These overhead valves are all operated by a single camshaft mounted in the vee of the crankcase, through the medium of pushrods and rockers. Interposed in the rocker mechanism is an ingenious hydraulically operated automatic adjustment giving extreme silence throughout all ranges of speed and temperature. The crankshaft is balanced in a special manner to give great smoothness of running, also to reduce wear of crankshaft journals and bearings. An important point in the suppression of noise is the Rolls-Royce design of piston - a product of years of research.

Dual ignition is provided by battery through the medium of two independent electrical contact breakers and distributors, also two separate coils. The ignition timing is controlled automatically by a centrifugal governor which is incorporated in each ignition distributor unit.

A carburettor of the duplex downdraught type with fixed jet is placed in the vee formed by the cylinders, and feeding

ENGINE DETAIL "PHANTOM II"





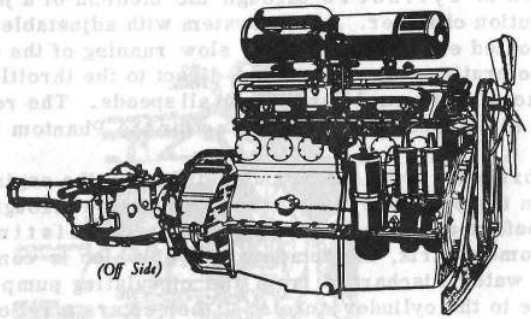
Rolls-Royce Brake System

each row of cylinders through the medium of a jacketed distribution chamber. An idle system with adjustable needle is embodied ensuring a reliable slow running of the engine. An accelerating pump connected direct to the throttle gives rapid acceleration and flexibility at all speeds. The remarks for the air cleaner are the same as for the Phantom II.

Lubrication is by a gear pump driven by the engine. The oil from the pressure side of the pump passes through an oil filter before entering a cooling chamber consisting of a honeycomb matrix, the temperature of which is controlled by the water discharged from the circulating pump on its passage to the cylinder jackets. It then enters a relief valve which determines the three different pressures used, thus ensuring that the lubrication requirements of every part of the engine are adequately met without excess of oil flow. These three pressures are obtained by spring loaded release valves arranged in series. The crankshaft and connecting rod bearings are fed at the full pressure of 25 to 35 lbs. per sq. in., the overhead valve rocker shafts at 10 lbs. per sq. in., and the timing wheels at $1\frac{3}{4}$ lbs. per sq. in. The remarks for the cooling system are the same as for the Phantom II, as are the remarks for the engine cooling mechanism, the electrical equipment, the clutch, the gearbox, and the universal joints.

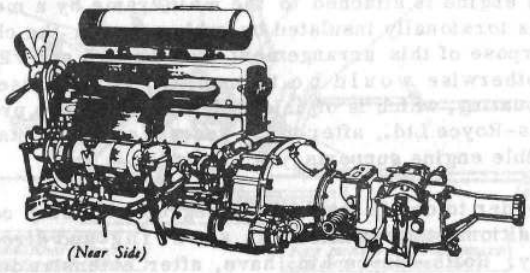
The engine is attached to the main frame by a mounting which is torsionally insulated by rubber from the chassis. The purpose of this arrangement is to absorb any vibration which otherwise would be transmitted to the passengers. The mounting, which is of unique design, has been produced by Rolls-Royce Ltd., after many years of experimental work on flexible engine supports.

In order to obtain the highest degree of riding comfort with additional improvements in steering and directional stability, Rolls-Royce Ltd. have, after extensive development, adopted the mounting of the front wheels as independent units. The wheels are carried at the outer end of a lever system of the "wishbone" type, controlled by helical



(Off Side)

Engine 25-30 H.P.



(Near Side)

springs working in a closed oil filled housing. This housing also contains the shock dampers and riding control mechanism.

The remarks concerning the rear road springs, the rear axle, the steering gear, the hydraulic shock dampers, and the centralised lubrication are the same as for the Phantom II.

The chassis frame is built of deep "box" section side members braced with a built up pressed steel cruciform crossmember, a maximum rigidity is obtained for a comparatively low weight of the completed unit.

A 33 gallon petrol tank is provided at the rear of the chassis. Petrol is supplied to the carburettors by an electrically operated duplex petrol pump. A fuel level indicator and warning light are provided on the instrument board. The latter indicates when the fuel is low.

Permanent lifting jacks of an approved design are fitted to the front suspension and rear axle. These are of the hydraulic type, controlled by hand pump conveniently situated for operating from the front seat.

Dunlop tyres 7.00 by 18 are fitted to the specially manufactured wire well base wheels which are fitted with the Rolls-Royce positive locking device, which securely prevents them from working loose in service.

The overall length of the car is	17 ft. 7 in.
Overall width	6 ft. 5 in.
Wheelbase	11 ft. 10 in.
Front track	5 ft. 0.6 in.
Rear track	5 ft. 2.6 in.
Turning circle in both directions	48 ft.

The final drive ratio is 4.25 to 1 which gives the following overall ratios in different gears.

First gear	12.75 to 1
Second gear	8.45 to 1
Third gear	5.59 to 1
Fourth gear	4.25 to 1

CHAPTER 7

Discriminate Buying, and the Cost of Running a Rolls-Royce

Many enthusiasts who would like to own a Rolls-Royce are deterred from buying by lack of knowing what constitutes a fair market price for a particular model. Scanning advertisement columns of motoring magazines reveals an amazing diversity in prices, that vary through a ratio of 1 to 9, for models that sound identical. Thus at times the price looks outrageously expensive, and at others ridiculously cheap. Rolls-Royce motor cars have had so many fables and superstitions built round them, that the true value of a particular car is frequently very difficult to determine, unless the natural respect that most people hold for these magnificent cars is ignored for the minute, and plain common sense applied to the purchase of one.

The purpose of this Chapter is to restore reason to the art of acquiring a Rolls-Royce that has already had one owner, and to give an approximate guide to the relative value of different models. The intention is to show how and why the value of a particular model varies, and to generally indicate the points to look for, the rubbish to leave alone, and the leads that can be usefully followed.

The first myth that should be discounted is that the car is of greater value if it's previous owner was titled. The only possible excuse there can be for this pernicious nonsense, is that the car may have had the careful attention of a chauffeur, who assisted materially in maintaining its pristine condition, but this is easily ascertained by a close examination of the paintwork and other parts of the car that should have received his care.

All models were subject to chassis and engine changes during manufacture with the exception of the 25/30, and these are of importance as they affect the market value. These

changes are fully dealt with in the chapter containing development history.

Irrespective of what type of Rolls-Royce you contemplate purchasing, the important point to bear in mind is to try and buy from a genuine Rolls-Royce enthusiast, whether he be a dealer or a private owner. The dealer, if a Rolls-Royce enthusiast, will ensure that you are satisfied with your purchase, and will do everything in his power to maintain it in good condition for you. An enthusiastic private owner will probably have spent a considerable sum in restoring the car and maintaining it in good condition, as opposed to the impecunious student who has done virtually nothing to maintain it, has just poured in petrol and oil to keep it running, and has painted some frivolous name on the bonnet. Ideally the car should not have had more than one owner. By buying from the individual who purchased the car new not only will you be able to get a complete history but it is very likely that the car has been maintained regularly and, for its age, is in near perfect condition. A one owner car is not necessarily worth more than the current average market price, but it is very heartening when you find one.

Hand in hand with the number of owners the car has had, is the type of maintenance it has been given. One owner cars have invariably received regular attention at the Rolls-Royce works in Hythe Road, and two owner, or chauffeur driven cars will also have probably been maintained properly. The history of the car is of importance and if a complete comprehensive servicing schedule is available at the manufacturers, this is worth an additional 10%. Although any form of documentation such as invoices are worth something. One or two owner cars are usually of low mileage, the average being 5,000 miles or less a year. In some instances it has been known to be as low as 1,000 miles a year.

After the second owner has sold the car, the vehicle's servicing history normally declines, largely because of high servicing charges at Hythe Road, and at other official Rolls-Royce agents. Not only are charges high but most owners at

this stage are very reluctant to send their car to an official agent where it will be examined ruthlessly by Rolls-Royce factory trained scrutineers, who will probably find many other faults, and Rolls-Royce do not like passing out cars that are not 100% perfect. As an instance of Rolls-Royce charges, a complete engine overhaul for a Phantom III costs about £1,100.

So the car slips down to a lower level where maintenance is less frequent and thorough and when work is carried out it is normally by the local garage, or by the dealer who is offering the car for sale. After a further 65,000 to 95,000 miles at this level, with now frequent changes of owner, the car will have reached a state where to have it restored by Rolls-Royce would probably cost between £2,000 and £4,000. Should anything go really wrong with the car it is now better to sell it for spares, than to try and have it repaired. Needless to say cars in this condition should be avoided at all costs, and if the points listed in Appendix I are faithfully checked, there is little excuse for buying a Rolls-Royce in poor condition.

Mileage is not of very great importance when dealing with cars that are twenty or thirty years old as much depends on the maintenance and servicing that the cars have had. An average Phantom III that had covered about 90,000 miles and had been regularly serviced and properly maintained would probably go on for a further 90,000 miles requiring only normal regular attention. A Phantom III that had been badly neglected could require a major rebuild by 100,000 miles. A Rolls-Royce of the thirties with a genuine mileage of less than 100,000 should have 10% added on to its value for every 10,000 miles under this figure.

Up to £100 should be used as a make weight in assessing the condition of the interior, paintwork, tyres, battery, and similar items. The body style is also of profound importance and this will have a considerable influence on the price of a car irrespective of its condition. This is because before the second world war Rolls-Royce made only chassis, and the

construction of the bodywork was left to specialist coachbuilders. They normally made all their bodies from aluminium, based on a well seasoned ash framework, and a list of the better known firms is as follows:

Arnold	Mann Egerton
Arthur Mulliner	Mayfair Carriage Co.
Barker	Offord
Cockshoot	Park Ward
Freestone & Webb	Rippon
Gurney Nutting	Salmons
H.J. Mulliner	Thrupp & Maberley
Hooper	Windover
Lancefield	Vanden Plas

The difference in value between one style and another is not a reflection on the quality of work of the different coachbuilders, but of the demand for a particular style, executed by perhaps a dozen different coachbuilders. The value of different body styles is as follows: Taking a saloon as the car that is regarded as average, a limousine, which is a large saloon with a partition between the driver and the rest of the passengers, and also is fitted with occasional seats in the rear is worth 30% less. A hearse, which is about the same size as a limousine, but arranged so as to carry coffins is worth about 60% less than a saloon, though of course it loses a lot of its solemnity if the colour is changed to yellow or a similar gay shade. A sedanca is a saloon or a limousine that has a driving compartment that can be opened to the sun, and is worth about 40% more than a normal saloon.

A sports saloon is a delightfully rakish and compact version of an ordinary saloon, and is sometimes termed an "owner/driver" car. It is worth about 25% more. A fixed head coupe looks like a drophead coupe, but has a fixed roof and is worth about 40% more. A sedanca coupe is also like a drophead coupe, but the hood can be retracted so as to open the front compartment. This is worth 65% to 75% more than a saloon. A drophead coupe is a refined tourer and is sometimes known as a convertible. The windows wind up, and the

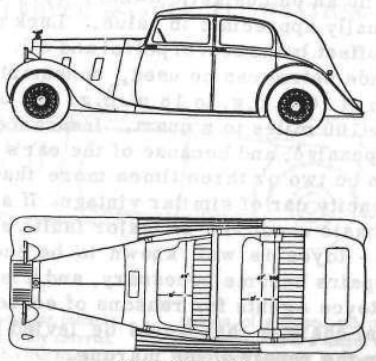
hood folds right back but not out of sight, and they are worth 75% to 80% more. A tourer is worth 100% more than a saloon and is a completely open car with separate side screens and a thin hood.

Although some of the modifications that were made to different models are important, others were merely introduced as a continuation of the policy of constant improvement, and in no way indicate that the original design was inefficient or defective. An example of this is the conversion from hydraulic to solid tappets in the Phantom III. Originally introduced as an optional modification to pre DL series cars, it cost £295 at the Rolls-Royce Depots. The reason for its introduction was that cars of owners who lived in London, or disliked speed seldom travelled fast enough to build up sufficient pressure in the hollow rocker shafts of the valve gear. The result of this was that sediment collected, and after a time the valves stuck, which gave rise to a most annoying "clinking" and "clacking". Other owners who drive their cars harder and faster also experienced trouble if they omitted to clean the hydraulic fluid filter, by washing it in paraffin at least once every 1,000 miles. After having travelled through this filter, which was located on the offside of the crankcase, the hydraulic fluid travels directly to the valve mechanism.

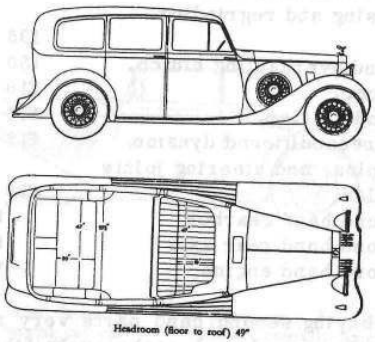
The Rolls-Royce Phantom I, II, and III all make use of aluminium cylinder heads which have one weakness. After a time they become weakened by corrosion, and internal and external cracks may develop. The corroded metal may also clog and choke the radiator and severely restrict the flow in the cylinder block and the water pipes. This is about the only fault that Rolls-Royce cars are prone to, and if an examination of the radiator water for traces of oil, and external "weeps" leads one to assume that the cylinder head is uncracked, a fast run will soon indicate by way of the temperature gauge whether the waterways and radiator are sludged up or not.

As far as running costs are concerned perhaps the first

THE 25-30 H.P.



Line drawings of
SPECIAL SALOON



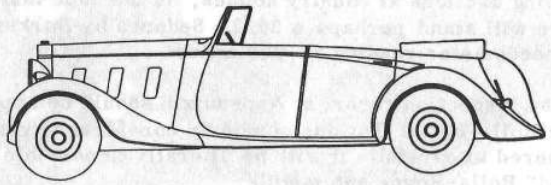
Line drawings of
TOURING LIMOUSINE

thing that should be considered is lack of depreciation. A normal contemporary car of medium performance costing perhaps £750 when new, depreciates by as much as 20% during the first year of its life. A pre-war Rolls-Royce cared for by an enthusiastic owner, will under most conditions actually appreciate in value. Lack of depreciation is partially offset by the cost of petrol and oil. Although commercial grade petrol can be used, consumption is normally in the region of 10 m.p.g. to 18 m.p.g. and oil consumption is frequently 100 miles to a quart. Insurance is another item that is expensive, and because of the car's large engine capacity, can be two or three times more than insurance for a small capacity car of similar vintage. If a car is purchased in sound basic condition, no major faults should develop, as the Rolls-Royce is well known to be incredibly reliable. Should repairs become necessary, and it is decided not to go to Rolls-Royce Agents for reasons of economy, the following are typical charges that would be levied by a garage specialising in the repair of the marque.

Repair	Phantom I, II, III.	20, 20/25, 25/30.
Reboring - New pistons and bearings throughout.	£200	£125
Overhauling valves, and all bearings on crankshaft.	£115	£70
Decarbonising and regrinding valves.	£35	£18
Relining and overhauling clutch.	£30	£20
New silencer.	£18	£12
Second hand starter.	£10	£8
Exchange reconditioned dynamo.	£12	£12
New king pins, and steering joints overhauled.	£30	£25
Sound second hand gearbox	£20 to £50	
Sound second hand rear axle	£20 to £50	
Sound second hand engine	£20 to £100	

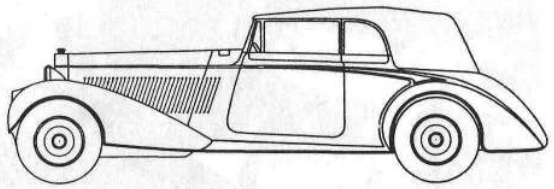
When buying second hand parts very much depends on where they are purchased, as obviously if they are purchased

ROLLS-ROYCE 40-50 H.P. ALL-WEATHER



A DUAL purpose car, interest in which has lately revived. For those who like to enjoy the delights of an open car in fine weather and yet require the protection of a closed car on other occasions, this is a useful type. It seats five persons in comfort and possesses a good appearance with the hood up or down.

ROLLS-ROYCE 40-50 H.P. SPORTS TOURER



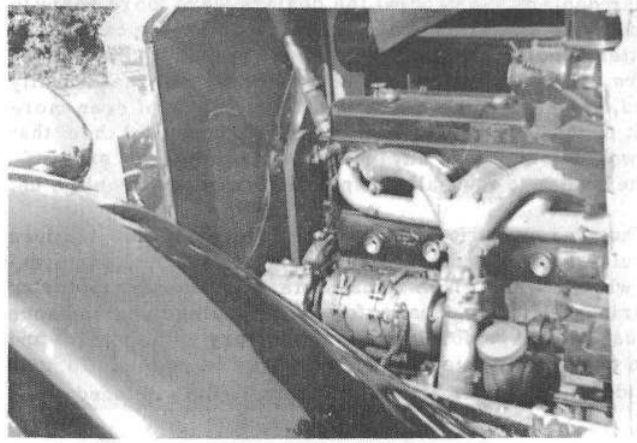
FOR those who desire a fully open touring car, yet possessing modern and up-to-date lines and equipment Both front seats are adjustable for length. Back seat wide enough for 3 passengers. For bad weather there is a carefully designed hood and side curtains which afford full protection. Provision for luggage at rear.

from a general car breaker, they will be very much cheaper and probably just as sound as if purchased from a garage specialising in stripping Rolls-Royce cars.

Even now, immaculate Rolls-Royce motor cars of the 1930 era are unearthed at auctions of property belonging to lately deceased landed gentry, and it is well worth while attending auctions at country houses, in the hope that in the garage will stand perhaps a 20/25 Sedanca by Barker, with the speedometer reading 25,000 miles!

The inspection report at Appendix I should be applied to every Rolls-Royce that one seriously considers buying, and if adhered to carefully it will be literally impossible to buy a "bad" Rolls-Royce automobile.

The Rolls-Royce 20/25 is one of the best of the lighter models.



Engine detail of the 20/25 Rolls-Royce.

CHAPTER 8

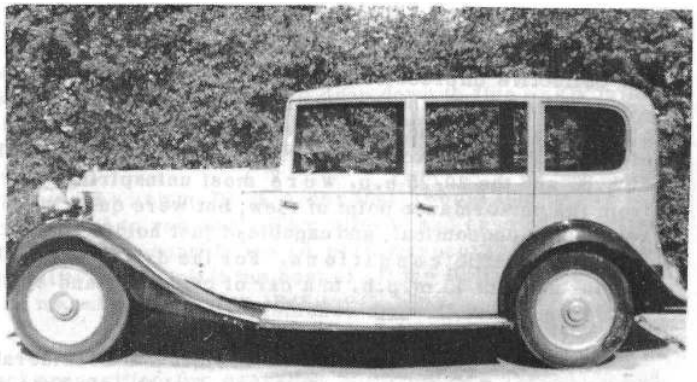
Contemporary Driving Impressions and Performance Data for the Phantom I, II, and III, and the 20, 20/25, and the 25/30.

In assessing these driving impressions of Rolls-Royce cars it should be remembered that some of the models driven were nearly forty years old and have travelled more than 250,000 miles.

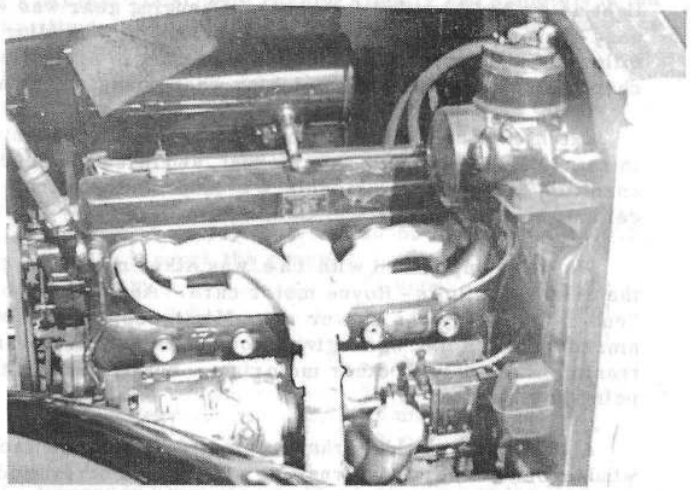
It would be unfair to single out individual cars for criticism as so much depends on the care and maintenance which each car has been given, and a false impression of a particular model may be easily created if it is in exceptionally good, or poor, condition.

To make these tests as representative and useful as possible, we tested as many cars of each type as we could in a 10 day period. The cars were not specially prepared in any way, and the condition they were in was exactly as they were offered for sale by various private owners and regular dealers. In general the dealers were more happy to co-operate with us, and in nearly all cases their cars were in better condition than those offered for sale by the private owners, whose cars were not always fairly and realistically priced, as invariably were the dealers. It is of even more credit to the regular dealers that although we told them that they would not receive any individual publicity from submitting their cars to test, all except one were happy to oblige us.

The average performance of the different models is given in tabulated form, and compared with their average performance when new, as given at that time in the leading motoring magazines. A further reason for giving average performance figures, is that performance tends to vary with the size and shape of the body fitted, and it would not be possible to give individual figures for all the different styles produced.



The Rolls-Royce 20/25. A practical and economical model.



Engine detail of the 20/25 Rolls-Royce.

Collective impressions of the models subjected to test are as follows. The seating position in all the cars was very high above the ground which gives one an enormous feeling of security and an exceptionally good view of the road. The 20 h.p. and the 20/25 h.p. were most uninspiring to drive from the performance point of view, but were quiet running, reasonably economical, and capable of just holding their own in modern traffic conditions. For the driver who enjoys touring at 40 to 45 m.p.h. in a car of character and refinement they are well worth considering.

Phantom I and II models are subject to a considerable degree of chassis flexing, and one can feel the six huge cylinders working underneath the bonnet. The torque at low revolutions can only be described as steam like, and the silence and degree of refinement of these vast engines is truly remarkable. Fuel consumption is miserable.

The clutch and brake actions on all the models were fairly light, though the steering on the larger Rolls-Royce is not as light as we had been led to expect. Changing gear was very easy even on the models without synchromesh, providing one followed the instructions as regards pausing in neutral when changing up, and double declutching when changing down.

Extensive use of aluminium for body panelling meant that in nearly all cases there was no rust, and indeed the overall condition of most of the models we inspected was truly excellent.

We were impressed with the way other motorists treat the drivers of Rolls-Royce motor cars. Apart from being "cut-up" once by the driver of a Mini-Cooper, we were amazed to find we were given courteous and preferential treatment not only by other motorists, but by policemen on point duty as well.

A Philistine would perhaps complain about the lack of windscreen washers, internal heating, and other modern amenities, but these of course could all be fitted by an enth-

usiastic owner. The magnificent torque of the larger engine, allowed the Phantom I and II to drop down to five or six miles an hour in top gear, which meant of course that if one were not in a hurry the gearbox could be ignored almost completely.

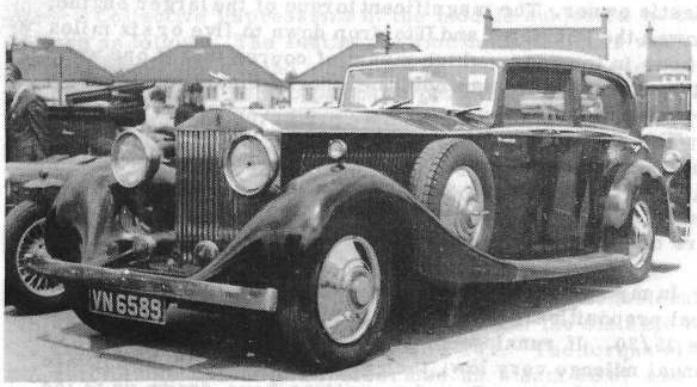
The Phantom III is a car that I would like to own if I could afford to run one. For silence and ease of operation allied to a reasonably good performance and exceptional durability, we think it the best of all the Rolls-Royce motor cars manufactured up to 1946.

In my opinion the only Rolls-Royce cars that are a practical proposition for everyday motoring are the 20/25 and the 25/30. If running costs are of little consideration, or annual mileage very low, then the Phantom I, II, and III are worth considering. Our observations have drawn us to the conclusion that if you buy a sound pre-war Rolls-Royce car, not only will you be purchasing a car of tremendous character, made to engineering standards that few manufacturers have equalled and none have bettered, but that you will be purchasing a car that will still be running silently and smoothly in ten years time, when the mass produced products of today are rusting relics in the breakers yard.

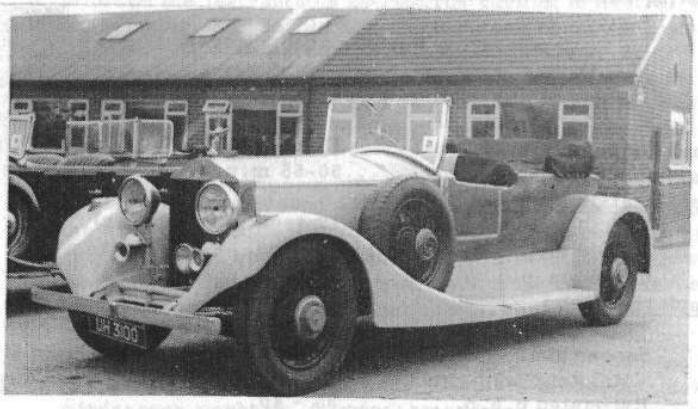
Comparative Performance Figures

Rolls-Royce 20

Fuel Consumption .....15-18 m.p.g. (20 m.p.g.)
Maximum Speed .....50-55 m.p.h. (59 m.p.h.)
Acceleration through the gears:
0 to 30 m.p.h. ..... 12 secs. (not known)
0 to 40 m.p.h. ..... 19 secs. (not known)
0 to 50 m.p.h. ..... 32 secs. (not known)
Performance:
Third gear ..... 55 m.p.h. (59 m.p.h.)
Second gear ..... 32 m.p.h.
First gear ..... 13 m.p.h.
Estimated b.h.p. ..... 35 - 40.
(The figures in brackets are those given when the Model was new.)



Rolls-Royce Phantom II 40-50 h.p. This immaculate 1935 model is fitted with the impressive sports saloon body, and is one of the last 40-50 h.p. Rolls-Royce models made.



Rolls-Royce Phantom II 40-50 h.p. Originally built in 1930, this interesting model is fitted with a replica open skiff body.

Rolls-Royce 20/25

Fuel Consumption	14-17 m.p.g.	(15-17 m.p.g.)
Maximum Speed	64 m.p.h.	(74 m.p.h.)
Acceleration through the gears:		
0 to 30 m.p.h.	11 secs.	(10)
0 to 40 m.p.h.	16 secs.	(15)
0 to 50 m.p.h.	24 secs.	(20.5)
0 to 60 m.p.h.	37 secs.	(32)
Performance:		
First gear	19 m.p.h.	(20 m.p.h.)
Second gear	36 m.p.h.	(38 m.p.h.)
Third gear	56 m.p.h.	(58 m.p.h.)
Fourth gear	64 m.p.h.	(74 m.p.h.)
Estimated b.h.p.		(40 - 45)

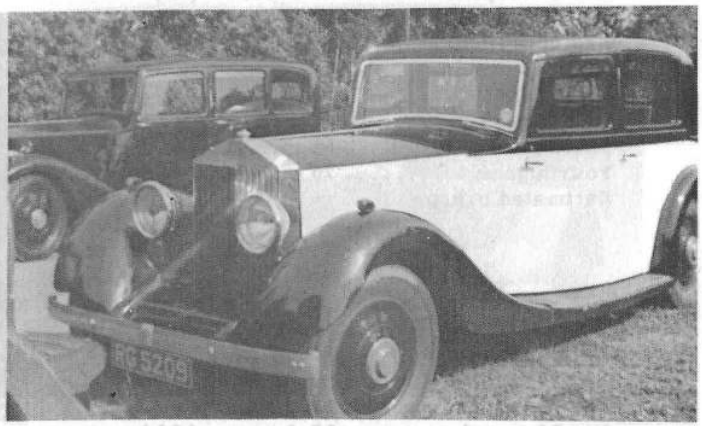
Rolls-Royce 25/30

Fuel Consumption	14-16 m.p.g.	(17 m.p.g.)
Maximum Speed	70 m.p.h.	(78 m.p.h.)
Acceleration through the gears:		
0 to 30 m.p.h.	8 secs.	(5)
0 to 40 m.p.h.	12 secs.	(8)
0 to 50 m.p.h.	18 secs.	(15)
0 to 60 m.p.h.	28 secs.	(24)
Performance:		
First gear	22 m.p.h.	(22 m.p.h.)
Second gear	43 m.p.h.	(42 m.p.h.)
Third gear	62 m.p.h.	(61 m.p.h.)
Fourth gear	70 m.p.h.	(78 m.p.h.)
Estimated b.h.p.		(55 - 60)

Rolls-Royce Phantom I

Fuel Consumption	9-12 m.p.g.	(10-14 m.p.g.)
Maximum Speed	76 m.p.h.	(90 m.p.h.)
Acceleration through the gears:		
0 to 30 m.p.h.	7.2 secs.	(5)
0 to 40 m.p.h.	11.2 secs.	(8)
0 to 50 m.p.h.	17.0 secs.	(16)

The Rolls-Royce Phantom III fitted with the V.12 engine.



The Rolls-Royce 20/25 attractively finished in two tone cream/black.

0 to 60 m.p.h.	24.0 secs.	(23)
0 to 70 m.p.h.	37.0 secs.	(36)
Performance:		
First gear	23 m.p.h.	(24 m.p.h.)
Second gear.....	44 m.p.h.	(45 m.p.h.)
Third gear	66 m.p.h.	(70 m.p.h.)
Fourth gear	76 m.p.h.	(90 m.p.h.)
Estimated b.h.p.....	105 to 110	

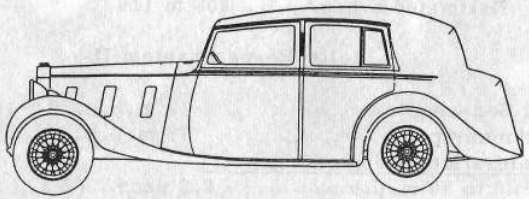
Rolls-Royce Phantom II

Fuel Consumption.....	8-12 m.p.g.	(10-14 m.p.g.)
Maximum Speed	78 m.p.h.	(90 m.p.h.)
Acceleration through the gears:		
0 to 30 m.p.h.	6.2 secs.	(5)
0 to 40 m.p.h.	10.5 secs.	(8)
0 to 50 m.p.h.	16.0 secs.	(15)
0 to 60 m.p.h.	23.0 secs.	(22)
0 to 70 m.p.h.	36.5 secs.	(35)
Performance:		
First gear	22 m.p.h.	(23)
Second gear.....	42 m.p.h.	(44)
Third gear.....	65 m.p.h.	(68)
Fourth gear	78 m.p.h.	(90)
Estimated b.h.p.	110 to 115	

Rolls-Royce Phantom III

Fuel Consumption.....	8-10 m.p.g.	(10 m.p.g.)
Maximum Speed	94 m.p.h.	(90 m.p.h.)
Acceleration through the gears:		
0 to 30 m.p.h.	5.4 secs.	(6)
0 to 50 m.p.h.	13.0 secs.	(12)
0 to 60 m.p.h.	18.0 secs.	(17)
0 to 70 m.p.h.	26.2 secs.	(25)
0 to 80 m.p.h.	36.0 secs.	(35)
Performance:		
First gear	28 m.p.h.	(27)
Second gear.....	45.2 m.p.h.	(45)
Third gear.....	75 m.p.h.	(74)
Fourth gear.....	93 m.p.h.	(90)
Estimated b.h.p.....	150 to 160	

ROLLS-ROYCE 40-50 H.P. TOURING LIMOUSINE

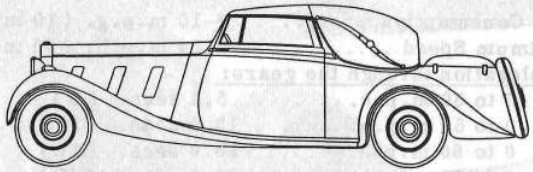


A ROOMY owner-driver car for 5 people. By raising the window in the division, the front compartment may be separated from the passenger compartment. There is a sunshine roof and room for emergency seats of the type which face sideways.

Draughtless ventilation provided to rear compartment.

There is ample provision for carrying luggage.

ROLLS-ROYCE 40-50 H.P. SEDANCA COUPE



THIS is a popular dual purpose 5-seater car with the head arranged so as to give a choice of three positions, i.e. fully closed, fully opened and an intermediate position which is shown in coloured illustration above. Its appearance is attractive with the hood in any one of the three positions available and it is a useful type for the owner-driver who likes on occasions to have a fully opened car.

APPENDIX I

Rolls-Royce Inspection Report for Prospective Buyers

Type: ..... Model: .....
Year: ..... Body: .....
Engine No..... Chassis No.....

GENERAL

Changes from the original to the following:-
Body: ..... Fuel system:.....
Electrical system:.....
Headlights:..... Extras:.....
History from Registration Book: .....
.....
.....
.....
History from Rolls-Royce: .....
.....
.....
.....
History from present owner: .....
.....
.....
.....

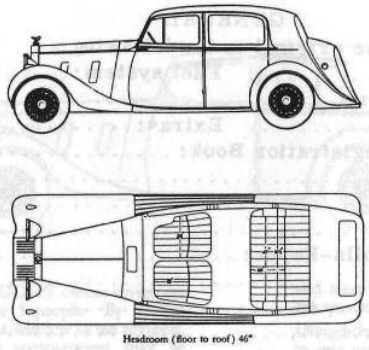
ENGINE

Check oil for water (cracked block):.....
Check water in radiator for oil: .....
Check for external oil leaks: .....
Condition of radiator core: .....
Condition of radiator hoses: .....
Compression: .....
Check manifolds for fractures: .....
Condition of wiring:.....
Colour of carbon inside tail pipe: .....
Wear on starting handle dogs:.....
Check engine for external water leaks: .....

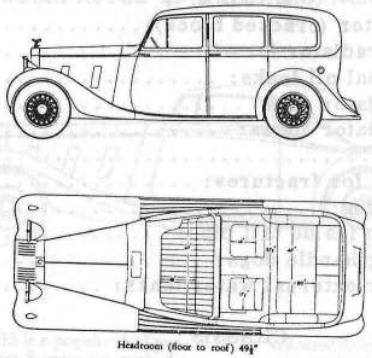
CHASSIS

Tyres % wear: .....
Steering faults: .....

ROLLS-ROYCE "WRAITH"



Line drawings of
SALOON



Line drawings of
ENCLOSED LIMOUSINE

Set of road springs: .....
King pins - Condition: .....
Track rod ends - Condition: .....
Drop arm - Condition: .....
Drag link - Condition: .....
Condition of shock dampers: .....
% Wear of brake linings: .....
Brake adjusters - position: .....
Movement foot pedal: .....
Movement hand brake: .....
Condition of silencer and exhaust system: .....
Condition of battery: .....
Condition of Instruments: .....
.....
Condition and functioning of all electrical components: .....
Horn: ..... Wipers: .....
Headlights: ..... Sidelights: .....
Tail lights: ..... Brake lights: .....
Instrument lights: ..... Interior lights: .....
Cigar lighters (if fitted): .....
Heater and Radio (if fitted): .....
Rear number plate light: .....
Ignition warninglight: .....
Does overide control for shock dampers function correctly?
.....
Is chassis oiling system working?.....
Condition of clutch: .....
Is clutch pedal action smooth and light? .....
Is steering action smooth and light?.....
Condition of wheels: .....
Is synchromesh still effective? .....

BODY

Coachbuilder: .....
General condition: .....
.....
.....
Cellulose or paintwork - condition: .....
.....
Colour: .....
Condition of nickel plating on radiator and other bright parts
.....

Rust (if body not aluminium):.....
Hang of doors:.....
Are windows functioning correctly ?.....
Condition of window glass:.....
Are all tools present?.....
Condition of wings:.....
Condition of floor and boot interior:.....
Check "Silver Lady" mascot:.....
Condition of interior:.....
Seats:..... Woodwork:.....
Carpets:..... Upholstery:.....

ROAD TEST

Starting ability cold:.....
Starting ability hot:.....
Exhaust smoke:.....
Braking ability:.....
Does servo function?.....
Cornering power:.....
Acceleration:.....
Gear box wear:.....
Rear axle whine:.....
General transmission noise:.....
Oil pressure (after at least 35 minutes running):.....
Body noise:.....

APPENDIX II

Oil Viscosity Lubrication Charts

Component	20 H.P.	20/25 H.P.
Engine:	S.A.E. 30	S.A.E. 30
Gearbox:	S.A.E. 80/90	S.A.E. 30
Steering box:	S.A.E. 80/90	S.A.E. 40/50
Rear axle:	S.A.E. 80/90	S.A.E. 80/90
Chassis Oil Tank:	-	S.A.E. 30
Shock dampers:		S.A.E. 20
Front and Rear Hubs:	Ball Bearing grease	
Propeller Shaft:	S.A.E. 40/50	F.T.G. *
Distributor Lubricator:	S.A.E. 20	S.A.E. 20
Contact breaker Cam:	Flow type grease	
Hand oiling points:		S.A.E. 20
Water pump:	W.P.G.	W.P.G.

Component	25/30 H.P.	Ph.I
Engine:	S.A.E. 30	S.A.E. 30
Gearbox:	S.A.E. 30	S.A.E. 80/90
Steering box:	S.A.E. 30	S.A.E. 80/90
Rear axle:	Hypoid	S.A.E. 80/90
Chassis oil tank:	S.A.E. 30	-
Shock dampers:	S.A.E. 20	S.A.E. 20
Front and Rear Hubs:	Ball Bearing grease	
Propeller Shaft:	F.T.G.	S.A.E. 80/90
Distributor Lubricator:		S.A.E. 20
Contact breaker Cam:	Flow type grease	
Starter Motor Gears:	S.A.E. 30	-
Hand oiling points:		S.A.E. 20
Water Pump:	W.P.G.	W.P.G.

* Prior to chassis No. GKC - 22 use S.A.E. 80/90.

Component	Ph.II	Ph.III
Engine:	S.A.E. 30	S.A.E. 30
Gearbox:	S.A.E. 30	S.A.E. 40/50
Steering box:	S.A.E. 80/90	S.A.E. 30
Rear axle:	Hypoid	Hypoid

Chassis oil tank:	S.A.E. 30	S.A.E. 30
Front Suspension:	-	S.A.E. 20
Shock dampers:	S.A.E. 20	S.A.E. 20
Front and Rear Hubs:	Ball bearing grease	
Propeller Shaft:	F.T.G.**	F.T.G.
Distributor lubricator:	S.A.E. 20	
Contact breaker Cam:	F.T.G.	
Hank Oiling points:	S.A.E. 20	
Water Pump:	W.P.G.	

** Prior to chassis No. 96 - 8K use S.A.E. 80/90

F.T.G. - Flow type grease

Castrolease CL	Retinax CD
Mobilgrease No.2	Esso Universal

Ball bearing grease

Belmoline C	Castrolease Heavy
Retinax R.B.	Esso grease

W.P.G. - Water pump grease

Belmoline A	Castrolease WP
Retinax P	Mobilgrease No. 6
Esso W.P.	Adcol SS

Printed (Litho) by George Roper, 46 Lewis Lane, Cirencester, Glos.

Other Motoring Titles Published by J. H. Haynes & Co., Ltd.

OWNERS WORKSHOP MANUAL SERIES

		post paid
AUSTIN HEALEY SPRITE & M.G. MIDGET OWNERS WORKSHOP MANUAL J. H. HAYNES	**30/-**	31/6
AUSTIN A35/A40 OWNERS WORKSHOP MANUAL J. H. HAYNES	**30/-**	31/6
FORD ANGLIA OWNERS WORKSHOP MANUAL S. F. PAGE, M.I.B.C.A.M., M.M.I.A., A.M.I.E.D.	**25/-**	26/6
FORD CORTINA/CORSAIR O. W. M. S. F. PAGE, M.I.B.C.A.M., M.M.I.A., A.M.I.E.D.	**25/-**	26/6
MORRIS MINOR 1000 OWNERS WORKSHOP MANUAL J. H. HAYNES	**30/-**	31/6

TUNING MANUAL SERIES

B.M.C. 'A' SERIES TUNING MANUAL J. H. HAYNES	***12/6**	13/6
FORD 105E/122E TUNING MANUAL J. H. HAYNES	***12/6**	13/6
MINI TUNING MANUAL J. H. HAYNES	***12/6**	13/6

GENERAL MOTORING TITLES

AMATEUR RACE AND RALLY DRIVER J. H. HAYNES	***12/6**	13/6
FORD SPECIAL BUILDERS MANUAL G. B. WAKE	***12/6**	13/6
GUIDE TO COMPONENT CARS J. H. HAYNES	***12/6**	13/6
GUIDE TO USED SPORTS CARS Vol. I J. H. HAYNES	***12/6**	13/6
GUIDE TO USED SPORTS CARS Vol. II J. H. HAYNES	***12/6**	13/6
HIGH SPEED DRIVING J. H. HAYNES	***12/6**	13/6
HOW TO BUILD AUSTIN SPECIALS J. H. HAYNES	**8/11**	10/-
ROLLS-ROYCE POWER OF GRACE W. L. H. ALLPORT	**25/-**	26/6
ROLLS-ROYCE MANUAL 1925-1939 J. H. HAYNES	***12/6**	13/6
SUCCESSFUL CAR DEALING G. B. WAKE	**12/6**	13/6
VINTAGE AUTOMOBILES Vol. I H. THORNTON RUTTER	**30/-**	31/6
VINTAGE AUTOMOBILES Vol. 2 H. THORNTON RUTTER	**30/-**	31/6

*These titles are also available in a hard bound edition at 21/- from any bookseller, or 22/6 post paid from the publisher's trade and retail distributors.

MOTORISTS' BOOKSHOP
Yeovil, Somerset