

FIAT

FIAT MOTORS, Ltd.,
37 & 38 Long Acre,
LONDON, W.C.



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FIAT

LIVE-AXLE CARS

THEIR CARE,
LUBRICATION AND
ADJUSTMENT.



FIAT MOTORS, LTD.,

37 & 38 LONG ACRE,

LONDON, W.C.

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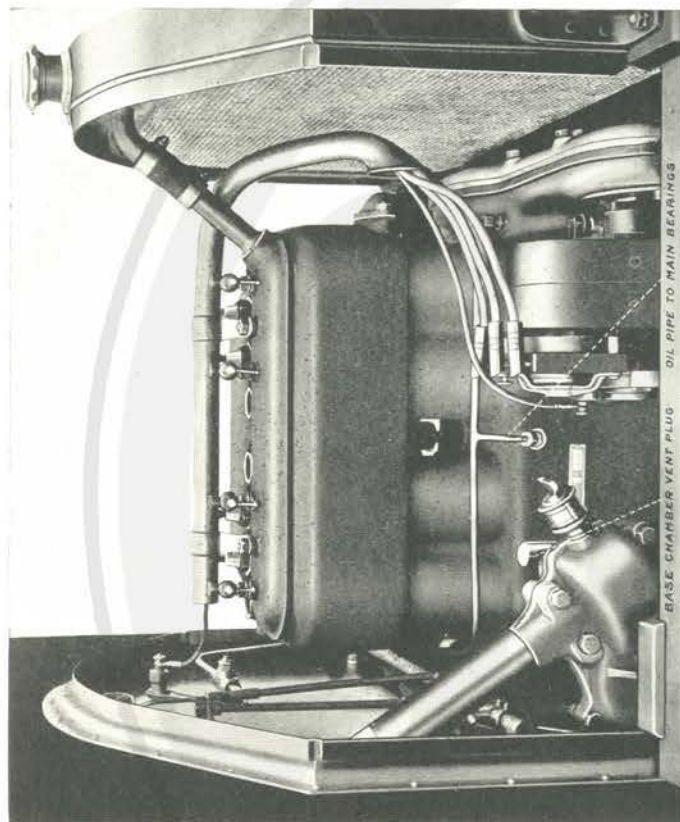
Telegrams :
"FIATISM,
LONDON."

Codes Used :
A.B.C. 5th Edition.
Lieber's Standard.

Works and Stores : WEMBLEY, MIDDLESEX.

Telegrams : "FIAT, WEMBLEY."
Telephone : 44 Wembley (2 lines).

August, 1910.



12/14 H.P. FIAT ENGINE, SHOWING MAGNETO.

INSTRUCTIONS

AS TO THE
LUBRICATION, ADJUSTMENT & RUNNING OF
THE 12/14, 15/20, 28/35 and 40/50 H.P.
FIAT CARS.

Introduction.

THE design and construction of the Fiat Car are so exceedingly simple that very little in the way of instruction is necessary.

It is essential, nevertheless, that proper care be exercised in the lubrication, adjustment and running of even the simplest machinery.

The object of these notes, therefore, is to direct the attention of drivers of Fiat Cars to those points which need occasional attention in order to ensure continuously satisfactory running.



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LUBRICATION.

The quality of lubricating oil employed, more especially for the engine and the clutch, is of primary importance. It is necessary with engines where forced lubrication is employed to use oil of thick consistency. We have arranged for the preparation of oils and grease specially suited to the Fiat Car, and these we unhesitatingly recommend our customers to adopt. Prices will be found at the end of the book. On no account should graphite or any solids be used in the lubricant.

The Engine. The quantity of oil necessary to ensure efficient lubrication is determined by the capacity of the reservoir formed by the bottom half of the base chamber of the engine. The right level is about $\frac{1}{2}$ in. below the inspection cover, and oil should always be kept up to this level. No oil should be introduced into the base chamber without being first filtered, and the oil should be constantly tested, and as soon as it is found that it is beginning to thin, all the oil should be washed out of the base chamber and the latter refilled with fresh oil.

The reservoir capacity of the various models is as follows:—

12/14 H.P.	-	-	-	1 gallon.
15/20 H.P.	-	-	-	$1\frac{3}{4}$ "
28/35 H.P.	-	-	-	2 "
40/50 H.P.	-	-	-	$2\frac{1}{2}$ "

The following diagram and details will explain fully the various parts of the forced feed lubrication system.

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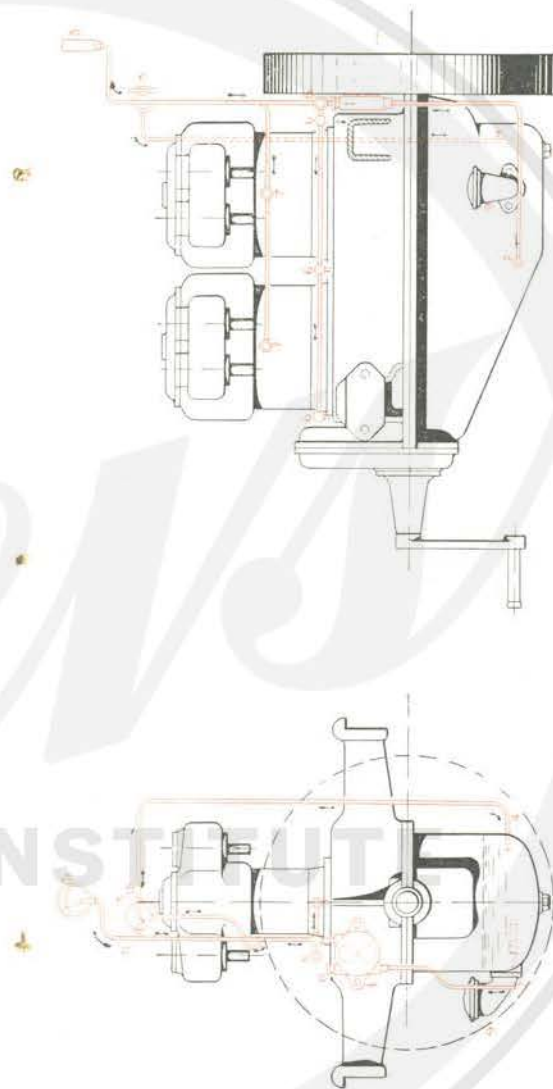


TABLE.

1. Rotary pump.
2. Oil filter at base of reservoir.
3. Plunger for auxiliary oil supply to cylinder walls on 28/35 and 40/50 models.
4. Union for overflow pipe.
5. Pressure indicator.
6. Feed pipes to bearings of engine.

7. Feed pipes to cylinders.
8. Pump regulator.
9. Oil filler.
10. Waste plug.
11. Pipe to auxiliary oil supply on 28/35 and 40/50 models.
12. Oil return pipe.
13. Oil pipe to cylinders.

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Briefly explained: "A" is the bottom half of the base chamber constructed with sump to act as a reservoir. A rotary pump (1) draws oil from reservoir "A" through pipe connected with oil filter (No. 2). After passing through the pump the oil enters a pipe (No. 6), taking the oil straight into the main bearings of the engine, and through these to the big ends and gudgeon pins of the connecting rods. In the 28/35 and 40/50 h.p. models an extra pipe is fitted to the pump in connection with pipe (No. 6) carrying the oil to a plunger (No. 3) fitted to the dashboard, which has the effect when depressed of allowing an extra flow of oil to be fed to the cylinder walls. In all models a pipe (No. 11) is connected also to the main oil feed (No. 6), terminating on the dashboard in a gauge (No. 5) showing the pressure of oil. The supply of oil on all models is regulated and adjustment is effected, when necessary, by means of a check valve fitted to the body of the pump—a screw which can be easily turned, increasing or lessening the pressure of the spring controlling the position of the valve, and thus regulating the quantity of oil fed to the bearings.

The check valve is constructed so that it automatically adjusts itself to either thin or thick oil, and that when the quantity of oil fed to the bearings is reduced, the excess oil pumped up does not return to the base, but to the suction side of the pump.

In order to ensure effective working, the following details require periodical attention:—

1. Before starting the engine, ascertain that the level of oil in the base chamber is correct, i.e., the oil should rise to within 1 in. of the top of the oil filler (9), or $1\frac{1}{2}$ in. in the case of the 12/14 h.p. model.

2. Use only a good quality of oil of a thick consistency.

3. When the engine is running the gauge should show a pressure of 2 to 3 metres, thus indicating perfect lubrication. The gauge should be examined occasionally on a run to see that the flow of oil is constant.

4. In the case of the 28/35 and 40/50 h.p. models the plunger should be depressed only occasionally for high speeds or continuous severe work when negotiating hills, etc.

5. If all the oil has been drained off and the base chamber re-charged with fresh, it may be found that the pump will not draw; this can be remedied quite easily by unscrewing the union at junction of main feed pipe and charging the pump itself with oil.

6. The base chamber should be emptied and re-charged with fresh oil whenever the oil shows signs of thinning, and the filter removed at the same time, by unscrewing the suction pipe at the base, and thoroughly cleansed.

The Clutch. Here, again, the quality and consistency of the oil employed are of considerable importance, and we strongly recommend our customers to use the specially prepared Fiat clutch oil.

To oil the clutch, turn the engine round until the filler plug is vertical, remove this and insert a syringe full of clutch oil, replacing plug before starting engine. Care should be exercised to force the oil in gently, otherwise it will overflow and run outside the clutch casing or puller. The pedal also should be depressed in order to disengage the discs and allow the oil to pass freely between them. The clutch should be oiled in the manner described every 200 miles, and after every four or five hundred miles should be thoroughly washed out with

LUBRICATION—*continued.*

paraffin. As an emergency substitute for proper clutch oil, ordinary engine oil may be employed.

Steering and Connections.

These are lubricated by means of Stauffer grease cups, a quarter-turn of which every morning is all the attention required, provided, of course, that the cups be kept supplied with grease and that the grease channels leading from the cups are clear.

Steering Gear.

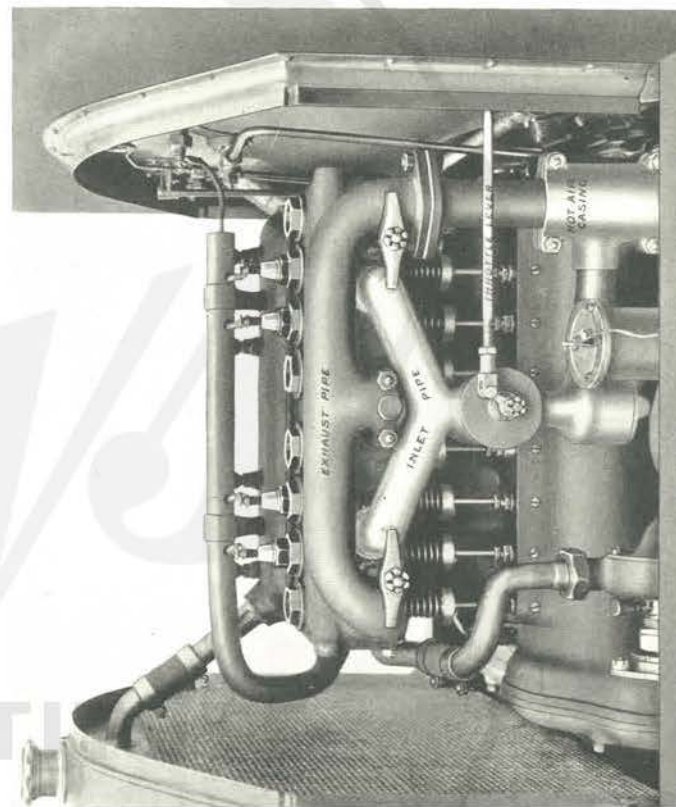
The steering gear on all models is of the worm and segment type, and irreversible. It is enclosed in an oil-tight casing and is lubricated by means of a Stauffer lubricator, which should be filled with grease and given about a quarter-turn each morning.

Axle Caps.

These should be filled with grease about every 1,000 miles, which is all the attention the wheel bearings need in the matter of lubrication. Care should be taken to replace the grub screw in the axle cap, and that the latter is free from dirt or grit before being screwed on to the hub.

The Gear Box.

This should be kept well supplied with a mixture of gear oil and thick yellow grease to the level of the top of the gear shafts. An examination should be made every two or three weeks to ascertain that a sufficiency of lubricant is maintained.



12/14 HP FIAT ENGINE, SHOWING CARBURETTOR, &c.

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Back Axle. The back axle, bevel driving gears and differential are lubricated by means of a mixture of oil and grease as used for the gear box, inserted through the opening which will be found in the top of the axle casing which should be kept half full. It will generally be found necessary to add about half a gallon of oil and grease after every two or three thousand miles. Care must be taken to replace the plug after filling the casing.



INTERIOR OF FIAT CLUTCH.

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Cardan Joint. In the 15 20 h.p. model will be found a leather cover at the gear box end of the cardan shaft. The small end of the cover can be detached by dismounting the metal clips, allowing of the joint to be filled up with thick yellow grease. One filling should last about 2,000 miles, but an occasional examination is advisable in order to ascertain that the parts are being thoroughly lubricated.

In the 12 14 h.p., 28 30 h.p. and 40 50 h.p. models, a plug at the back of the cardan joint serves the same purpose as the leather cap in the 15 20 h.p. chassis.

Magneto. The magneto requires very little oil; a few drops at each bearing every morning being sufficient.

Grease Cups and Oilers. In addition to those parts specifically mentioned in the foregoing notes, grease cups and oilers are provided at other points where friction occurs.

Other Parts which require occasional attention, but which are not provided with grease cups and oilers, are:—

VALVE TAPPETS.

SPRING SHACKLE BOLTS on 12 14 and 15 20 h.p. models.

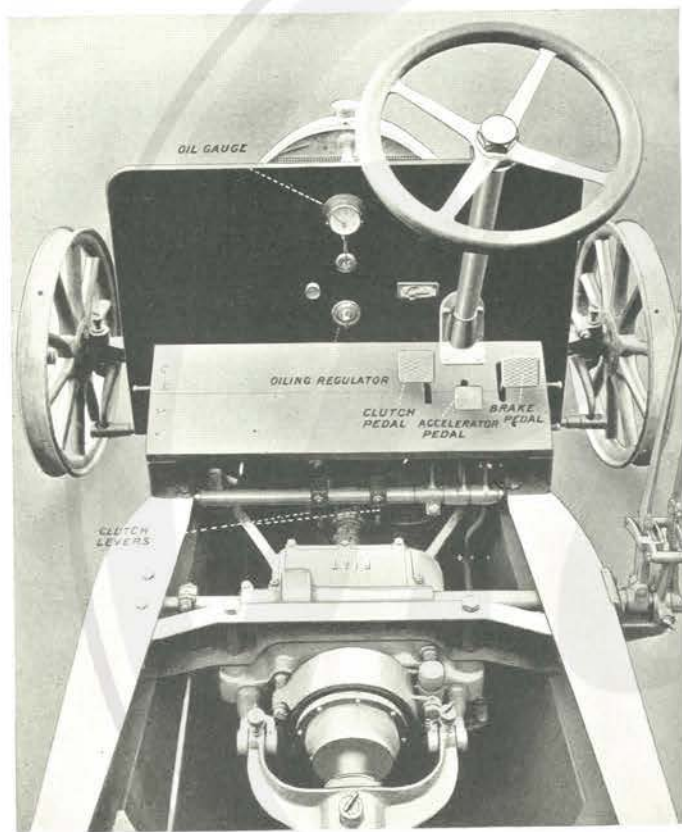
CHANGE SPEED AND BRAKE LEVER JOINTS.

CLUTCH AND BRAKE PEDAL GEAR.

STARTING HANDLE BEARING.

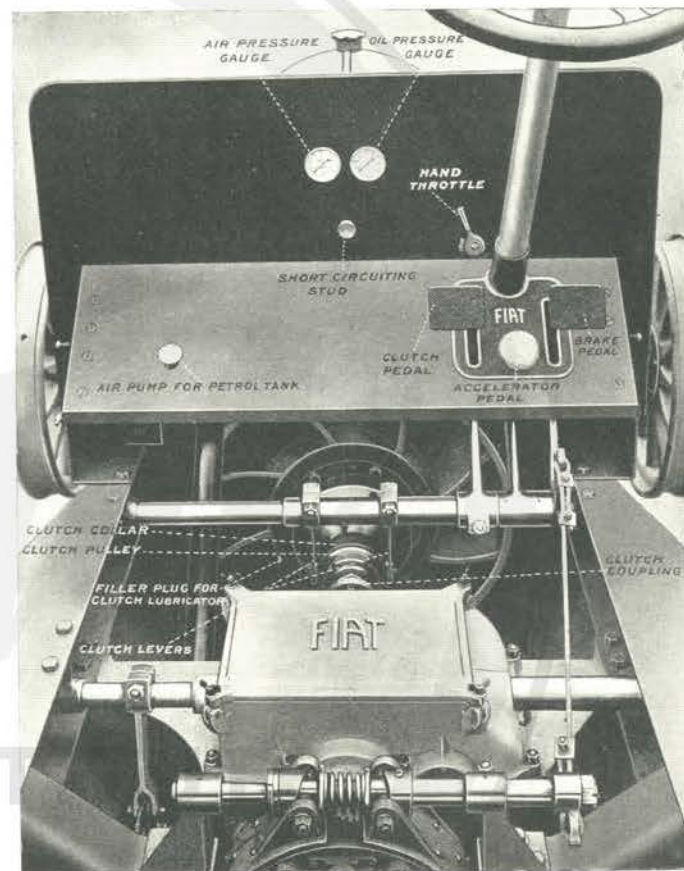
ACCELERATOR PEDAL GEAR.

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DASHBOARD OF 12/14 H.P. FIAT.

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DASHBOARD OF 15/20 H.P. FIAT.

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ADJUSTMENT.

Providing reasonable care be exercised and periodical attention paid to the car, very little adjustment will be necessary.

Brakes. To adjust the foot-brake, all that is ordinarily necessary is to lengthen or shorten the wire cable (or steel rods in those models to which these are fitted), the method of effecting which will be obvious on examining the connection.

After a certain amount of wear has taken place on the brake lining, however, it may be advisable to adjust the band itself. This is readily effected by means of the notched nuts on the near side of the brake-band spindle.

In adjusting the band care should be taken not to tighten it to such an extent that there is the slightest binding on the drum when the brake pedal is in the "off" position, otherwise unnecessary friction and consequent wear will result.

On no account should the wear on the brake lining be allowed to proceed too far, or the band itself is likely to be damaged, which would involve a much more costly renewal than the replacement of the cast iron liners.

The side brakes are adjusted in a similar manner to that described above, namely, by shortening or lengthening the connecting cables. Periodical attention should be given to the levers operating the internal expanding brakes on the road wheels, as, owing to their somewhat exposed position, they are liable to become rusted or clogged up with mud, which would materially interfere with the action of the brakes.

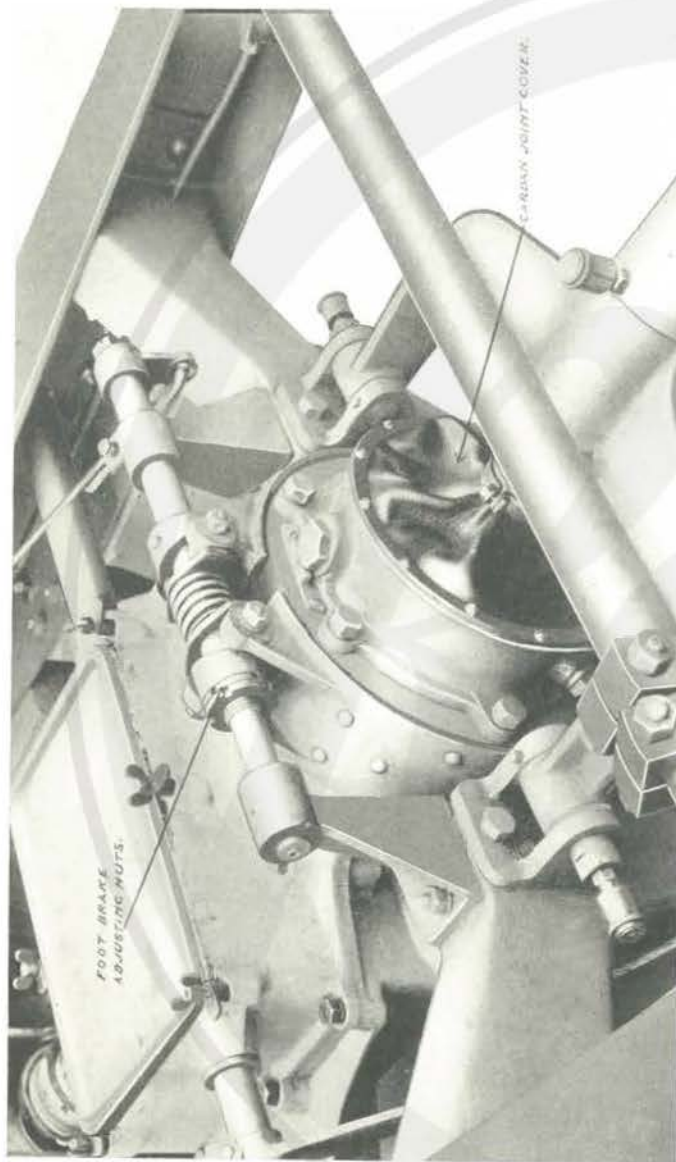
The Clutch. To adjust the clutch spring, slacken the nut furthest from the clutch levers; it will then be found a perfectly simple matter to adjust the concealed spiral spring by turning the nut-shaped end of the spring container inwards or

ADJUSTMENT—*continued.*

outwards, according to whether it is desired to increase or relieve the pressure.

Inspection and Adjustment of Valves. Both inlet and exhaust valves are readily accessible for examination by removing the inspection caps which are screwed in immediately over the valves. The inlet valve commences to open at a position 19 degrees in advance of the dead centre of the crank when same is at the top of the scavenging stroke and closes 20 degrees past dead centre. The exhaust valves open 25 degrees before the end of the explosion stroke (i.e., when crank is on bottom centre) and finishes 5 degrees past dead centre. Occasionally a very slight variation in the normal setting indicated above may improve the running, but this can best be ascertained by experiment. It is advisable, however, to adhere as closely as possible to the standard setting.

Timing the Engine. The engine is fitted with Bosch high tension magneto ignition and it is therefore necessary to time only one cylinder as all the others fire in rotation. Supposing the magneto is set correctly (i.e., that the time at which the armature casing cuts the magnetic lines of force between the two magnet poles is relatively correct with the setting of the half-time wheels) it is only necessary to ascertain that the No. 1 piston is at the top of the firing stroke—which is as nearly as possible the correct time for the spark to take place. This can be done by removing the small cover from the make and break of the magneto and moving the flywheel slightly backwards and forwards. The platinum points should then be just breaking when the piston is at the top of the stroke. If this does not occur adjust by moving the outer case round the make and break mechanism. If, however, for



FOOT BRAKE OF 15/20 H.P. FIAT CAR.

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ADJUSTMENT—*continued.*

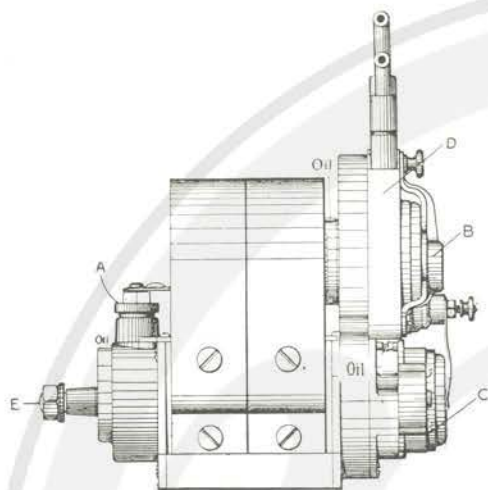
some reason or other the magneto has been detached from the engine or a new magneto has to be fitted, the work of timing and setting becomes rather more complicated, though if the following directions are closely observed no great difficulty should be experienced.

In the first place it is necessary to remember that the cylinders of the Fiat engine fire in the following order: No. 1 which is the second from the radiator, No. 2 next to the radiator, No. 3 third from the radiator, and No. 4 the next to the dash.

It will therefore be perfectly obvious that the high tension leads from the magneto to the sparking plugs must be so placed that the current is supplied to the plugs in the above mentioned order. An examination of the sketch No. 1 of the Bosch magneto will show that on the front end (i.e., that on which the driving pinion is fixed) there is a terminal marked A, this being connected by a bridge with the porcelain covered spark gap box and the whole being attached to an aluminium plate fitting between the magneto. On the opposite end there are two dust covers B and C, one enclosing the distributing mechanism, the other the contact breaker.

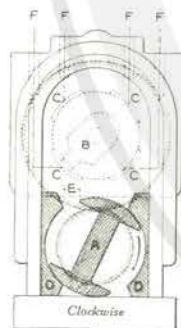
Before attempting to set the magneto, these two covers together with the connecting bridge A, must be removed. The magneto may then be placed in position on the engine bed-plate constructed for holding it, the magneto driving pinion being left loose on the cone of the armature spindle E. The motor should then be turned by hand until No. 1 piston (i.e., the second from the radiator) is on top of the compression stroke. Another half turn of the starting handle will then give the necessary 10 degrees advance when firing should take place. Next the magneto armature must be brought into position E as shown in illustration No. 2, the distance being about $\frac{1}{16}$ in., clockwise when viewed from the driving end of the

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This illustration represents the DR 4 type Magneto, the general principles of which are the same as the DU 4 Magneto, fitted to some of the later Fiat Cars.

- A. Contact screw, connected with spark gap connecting bridge and aluminium plate.
- B. Triangular clamp keeping dust cover in place.
- C. Cover of contact breaker.
- D. Vulcanite casing for leads enclosing distributing disc.
- E. Spindle of armature.



- A. Armature.
- B. Arm carrying carbon distributing brush.
- C. C. C. C. Contacts.
- D. Magnets.
- E. Position in which armature should be at top of firing stroke.
- F. High tension leads to plugs.

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ADJUSTMENT—continued.

magneto. Having got so far, the pinion may be temporarily tightened up on the armature spindle. The connection to the sparking plugs on the cylinders must next be made. The clamps securing the dust cover 13 in sketch 1 having been removed, also the cover C, it is an easy matter to ascertain on which of the four contacts C in sketch 2 of the distributor the carbon brush B is resting; this should then be connected from the corresponding magneto plug terminal to the sparking plug of cylinder No. 1. The next contact upon which the brush rests when the engine is turned by starting handle, should then be connected the plug of No. 2 cylinder—the next to No. 3 and the last contact to the plug of No. 4 cylinder.

It may be mentioned that the exact timing of the magneto varies slightly in each of the four models dealt with in this booklet. The foregoing instructions, however, will enable the driver to so adjust the magneto as to be approximately correct. The position at which the best results are to be obtained can, of course, be best found by experiment.

Clamp. The dust covers can then be replaced together with the triangular connecting bridge. Should any adjustment of the contact breaker be necessary, this can be carried out in the manner explained in the first paragraph dealing with the question of timing.

Carburettor. In the 15 20, 28 35 and 40 50 h.p. cars the normal level of the petrol in the jet should be 4 m/m to 5 m/m from the top, but as engines vary slightly in this respect, a slight departure above or below the level indicated may effect an improvement in the running in case the original adjustment has been altered. The petrol level may be altered by moving the collar carrying the governor up or down the spindle.

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ADJUSTMENT—continued.

Care should be exercised to avoid bending the spindle, otherwise continuous flooding may occur.

The correct height of the baffle stud above the jet is another adjustment which can best be ascertained by experiment.

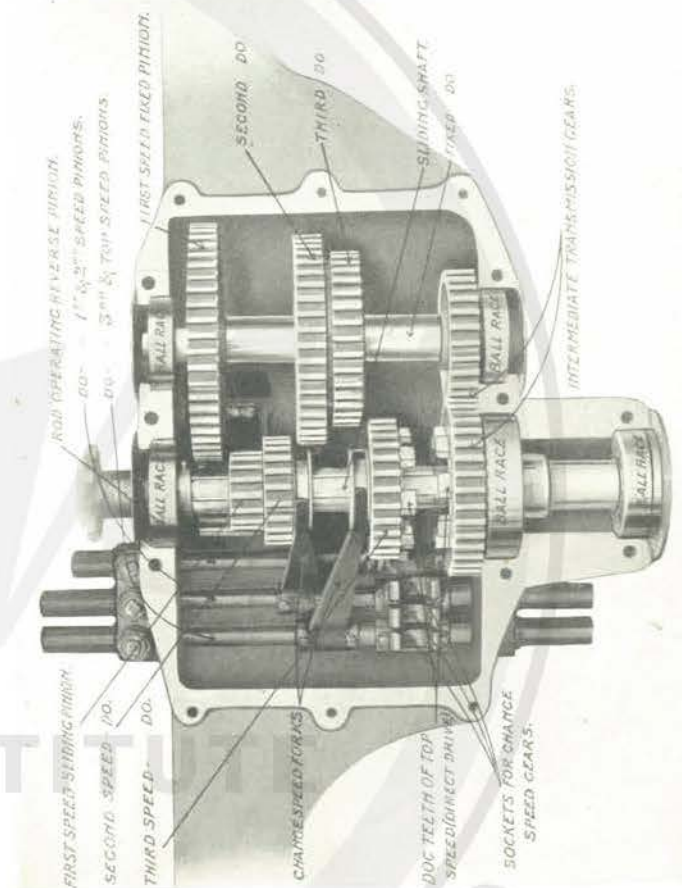
Ordinarily a quarter-turn of the baffle stud after having been screwed down on to the jet gives satisfactory results, but the most favourable position is readily obtained while the engine is running by screwing the baffle stud up and down a little.

Of carburettor adjustments the most vital is the level of petrol in the jet. Next in importance is the size of aperture in the jet. In our experience, in ninety-nine out of every hundred Fiat cars passing through our hands, the aperture of the jet as supplied gives the most satisfactory results. It is essential also that the position of the baffle stud be carefully adjusted. *But on no account should the size or shape of the auxiliary air ports be altered.*

The carburettor of the 12-14 h.p. model differs from the other types of Fiat models inasmuch as there are two jets and no baffle. The larger jet is covered and is not used when the engine is running light. As the throttle is opened and the speed accelerated thereby, the smaller jet is covered and the larger one brought into use.

The normal level of petrol in these jets should be from 1-2 mm from the top, but as engines vary slightly in this respect a slight departure above or below the level indicated may effect an improvement in running. Clients are strongly advised to leave well alone where the adjustment of carburettors is concerned, as the proper knowledge necessary to carry out the work is only obtained after considerable experience, and the unpractised mechanic may and usually does effect more harm than good by interfering with the carburettor.

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PLAN VIEW OF GEAR BOX OF 15/20 H.P. FIAT.

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GENERAL HINTS.

It is advisable, before starting for a run, to be satisfied that the oil, water and petrol tanks are full, and that all necessary tools and spares are on board. Make a practice of putting on the side-brake and placing change-speed lever in neutral position when stopping the car, but do not forget to release the side-brake before starting again. Before changing speed, withdraw clutch fully and be sure that the lever is in its proper position before letting the clutch in. Allow car to come to a standstill before putting change-speed lever into reverse position, or from reverse into a forward speed. Simultaneously with de-clutching, gradually reduce the speed of the engine by relieving the pressure on accelerator pedal to prevent engine from racing, accelerating immediately the change has been effected and clutch let in. When reversing, de-clutch immediately on releasing pressure on accelerator pedal, otherwise, should the momentum cause the car to over-run the engine, there will be a tendency to force the reverse pinion out of mesh and thus damage the teeth of the gear wheels.

In starting or changing speed, let the clutch in gradually, *but it should never be slipped*, as the clutch is constructed to permit automatically all the slip which is necessary or advisable. Never drive with a slipping clutch; rectify matters at once. In cold weather, more especially, it will sometimes be found on starting out that the first speed tends to resist engagement. This is due to the oil in the clutch having become congealed. To remedy this apply the side brake and put the reverse in, which, owing to its not being a sliding engagement, meshes easily. Then let the clutch in, but not sufficiently to put the car into motion. Two or three such applications will be sufficient to generate enough frictional heat

GENERAL HINTS—*continued.*

to "thin" the oil in the clutch and thus free the plates. Never run the engine longer than is absolutely necessary after the slightest indication of slackness in any of the bearings manifests itself. Have them seen to at once, otherwise considerable damage may occur. Do not drive the car if it emits any unusual noise, but stop at once and ascertain the cause and remedy the defect. Never race the engine nor run it unnecessarily.

If the compression is found to be getting weak, examine the valves, more especially the exhaust valves, and if there is any sign of pitting, re-grind the valves on their seats.

(It should be borne in mind that cleanliness is of the utmost importance, and especially does this apply to valves and their operating mechanism.)

Loss of compression may also occur through wear on the piston rings, in which case the latter should be replaced. Periodically examine the exhaust box, which may become choked with burnt oil. To ascertain if this is so, disconnect the exhaust pipe, and if engine runs appreciably better apply the obvious remedy.

Should the air pressure in petrol tank be found to leak, examine all joints in the pipe system, and if these are tight the leakage will probably be due to a leakage at the air valve of the engine. The mushroom valve should be taken out and ground into its seating. Adjustment of balance—that is to say the correct pressure necessary to allow the exhaust pressure to actuate the valve properly—is then easily obtained by means of the nut on the valve spindle which lessens or increases the pressure of the spring according to the direction in which it is turned. A perfect adjustment can be best obtained by running the engine and watching the air pressure gauge—the adjustable nut being tightened or loosened until the indicating needle of the pressure gauge remains stationary.

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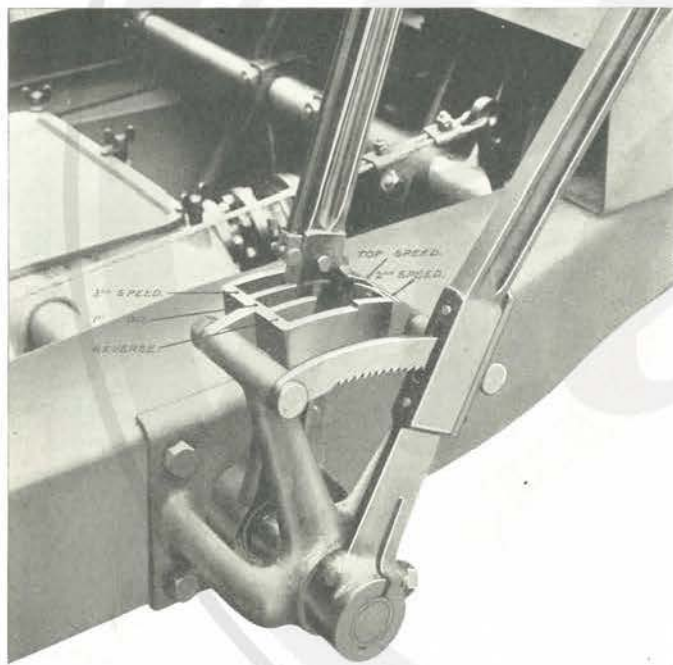
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GENERAL HINTS—*continued.*

In the 12/14 h.p. model the petrol is gravity fed, the tank being situated beneath the driver's seat. The remarks, therefore, regarding air pressure do not apply to this model.

In the event of the car remaining unused for several days it is strongly recommended to draw off the water from the radiator otherwise the impurities in the water will tend to corrode the brass radiator tubes. Especially is this precaution necessary in winter time to avoid the risk of the water being frozen in the cylinder water jacket.

Finally, the importance of absolute cleanliness cannot



CHANGE SPEED GATE OF 15/20 H.P. FIAT.

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GENERAL HINTS—*continued.*

be too strongly emphasized, an item which would appear to be overlooked to a considerable extent, with frequently serious results.

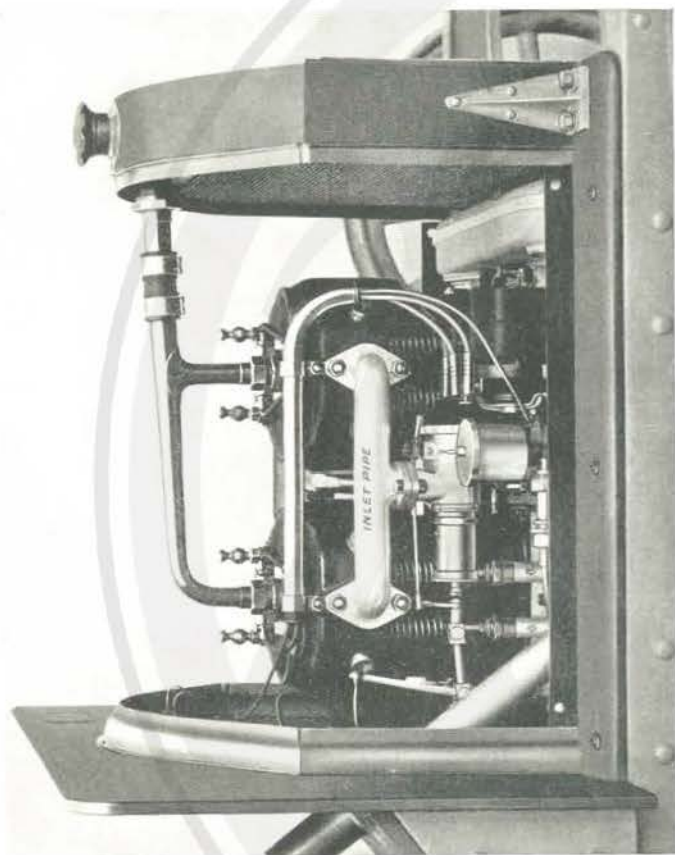
Excessive petrol consumption is often due to dirty valves or valve gear. Misfiring, occasioned by foul plugs, also conduces to heavy consumption. Pre-ignition, resulting sometimes in a broken crankshaft, invariably arises from carbon deposit being allowed to accumulate in the cylinders.

Many other more or less serious troubles may be avoided by the exercise of proper care in the matter of cleanliness.



FIAT WORKS, WEMBLEY.

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15/20 H.P. FIAT ENGINE, INLET SIDE.

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REPAIRS, GUARANTEE, &c.

All cars sold by Fiat Motors Ltd., are vended subject to the following guarantee:

Fiat Motors Ltd. will undertake to make good free of charge subject to inspection at their works at Wembley, any part of any chassis which may become broken or may be worn out owing to bad material within the period of six months from the date of sale by Fiat Motors Ltd., of such chassis. Customers wishing to claim renewal or exchange of defective parts must forward same carriage paid to Fiat Motors Ltd., Lancelot Road, Wembley, Middlesex, with a letter stating the number of chassis, horse power and date of purchase. Unless these conditions are fulfilled Fiat Motors Ltd. will not undertake any responsibility for renewal or exchange of such defective parts. Renewal or exchange parts will be returned by Fiat Motors Ltd., with all reasonable expedition, but delivery on any given date cannot be guaranteed.

In case of accident or breakdown we strongly recommend our customers to place themselves in communication with our Works at Wembley, where motor lorries are kept in readiness to pick up cars from within a day's journey from London.

When a car is being sent by rail it should be addressed to Fiat Motors Ltd., Wembley, Middlesex, and consigned to Willesden Junction Station, L. & N. W. Railway. If, at the same time, advice is sent as to despatch, arrangements will be made to collect the car on arrival at Willesden Junction.

Communications on the subject of repairs, replacements, or storage should be addressed to:

FIAT MOTORS LTD.,

WEMBLEY, MIDDLESEX.

Telephone:—43 and 44 WEMBLEY.
Telegrams:—"FIAT, WEMBLEY."

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SPARE PARTS FOR 12/14 H.P. CHASSIS.
(4-SPEED.)

DESCRIPTION.	PRICE.
ENGINE.	
Body of Cylinders with base but without accessories - - - - -	£ s. d. 49 16 0
Crankshaft - - - - -	15 10 0
Main Bearing (main pinion end) - - - - -	0 9 0
do. (flywheel end) - - - - -	0 10 0
do. (middle) - - - - -	0 9 0
Piston only - - - - -	1 15 0
Piston Ring—each - - - - -	0 2 2
Gudgeon Pin - - - - -	0 4 0
Big End Bearing - - - - -	0 8 6
Connecting Rod with Bush only - - - - -	1 6 0
Bush for Gudgeon Pin - - - - -	0 3 0
Main Pinion with Dogs - - - - -	1 3 0
Washer (copper and asbestos) for valve inspection cap—each - - - - -	0 0 4
Inspection Cap (inlet) - - - - -	0 5 6
do. (exhaust) - - - - -	0 5 0
Compression Tap - - - - -	0 4 0
HALF-TIME GEAR.	
Valve Lifter complete (inlet or exhaust) - - - - -	0 15 6
Valve only do. do. - - - - -	0 7 6
Valve Spring - - - - -	0 1 6
Valve Cup - - - - -	0 1 0
Valve Cotter - - - - -	0 0 6
Half-time Wheel complete - - - - -	1 7 0
Fibre Ring for do. - - - - -	0 14 6
Intermediate Wheel driving Magneto - - - - -	1 1 0
Fibre Ring for do. - - - - -	0 8 0
Magneto Pinion - - - - -	0 19 0
Pump Pinion - - - - -	0 17 0
IGNITION.	
Sparking Plug—Bosch - - - - -	0 3 6
Washer for do. (copper and asbestos) - - - - -	0 0 1
Insulated Wire—per foot - - - - -	0 0 5
Bosch High-tension Magneto DR 4 - - - - -	14 10 0
" " " " DU 4 - - - - -	10 0 0
WATER PUMP.	
Water Pump complete with Spindle, but without Pinion - - - - -	4 5 0
Centrifugal Wheel - - - - -	0 12 0

SPARE PARTS FOR 12/14 H.P. CHASSIS.
(4-SPEED.)

DESCRIPTION.	PRICE.
WATER PUMP—Continued.	
Drain Cock - - - - -	0 1 4
Pump Spindle with Key Nut and Washers - - - - -	0 5 6
CARBURETTOR.	
Small Jet - - - - -	0 2 0
Large " - - - - -	0 2 0
Throttle Sleeve - - - - -	0 18 0
Petrol Filter and Casing - - - - -	1 0 0
Float - - - - -	0 4 9
Float Chamber complete - - - - -	1 18 0
Cover for Float Chamber - - - - -	0 4 0
Bridge with Governors for Carburettor Needle - - - - -	0 2 6
Carburettor Needle - - - - -	0 2 6
OIL PUMP.	
Rotary Oil Pump with adjustable screw and connections - - - - -	2 18 0
Oil Pressure Gauge - - - - -	0 15 0
STEERING, &c.	
Coupling rod between steering lever and steering arm - - - - -	1 10 0
Transverse tie rod - - - - -	1 10 0
Steering Arm (nearside) - - - - -	0 11 0
Steering Arm (offside) - - - - -	1 2 0
Steering Worm and Shaft - - - - -	2 4 0
Steering Quadrant - - - - -	2 8 0
Front Axle only without Swivels - - - - -	6 0 0
Hub Cap (front or back) - - - - -	0 6 0
Swivel (nearside) - - - - -	1 16 0
Swivel (offside) - - - - -	1 16 0
GEAR BOX, DIFFERENTIAL, &c.	
Direct Drive Pinion and Shaft - - - - -	5 10 0
3rd Speed Sliding Pinion with direct drive dogs - - - - -	2 13 0
3rd Speed Fixed Pinion - - - - -	2 0 0
2nd Speed Sliding Pinion - - - - -	2 5 0
2nd Speed Fixed Pinion - - - - -	1 14 0
AC = " Constant Mesh - - - - -	2 10 0

SPARE PARTS FOR 12/14 H.P. CHASSIS.
(4.SPEED.)

DESCRIPTION.	PRICE.
GEAR BOX, DIFFERENTIAL, &c.	
—Continued.	
1st Speed Sliding Pinion - - - - -	2 12 0
1st Speed Fixed Pinion - - - - -	1 7 6
Reverse Pinion - - - - -	2 10 0
Differential Shaft Bevel - - - - -	2 10 0
Star Pinion - - - - -	1 18 0
Transmission Shaft Bevel - - - - -	~~1 7 0~~
Crown Bevel - - - - -	4 0 0
CLUTCH.	
Clutch Discs (outside) - - - - -	0 1 0
do. (inside) - - - - -	0 0 10
Clutch Spring - - - - -	0 5 6
Clutch complete - - - - -	9 5 0
Clutch Drum and Shaft - - - - -	2 10 0
BRAKES.	
Foot Brake Bands with Liners - - - - -	2 10 0
Side Brake Liners—per pair - - - - -	0 10 0
RADIATOR.	
Radiator complete - - - - -	13 10 0
Radiator Cap - - - - -	0 5 0
PETROL SUPPLY.	
Petrol Tank complete - - - - -	2 18 0
BALLRACES.	
Ballrace for Gear Box Shaft 50 x 50 x 20 - - -	0 19 0
do. do. do. 20 x 52 x 15 - - -	0 11 9
do. do. do. 35 x 50 x 21 - - -	0 18 6
do. do. do. 25 x 50 x 21 - - -	0 19 0
Ballrace for Transmission Shaft 50 x 110 x 27 -	1 10 0
Ballrace on end of Transmission Shaft 35 x 72 x 17 - - -	0 13 6
Thrust Ballrace for Transmission Shaft - - -	0 5 0
Ballrace for Differential Shaft 50 x 50 x 20 -	0 19 0
Thrust Ballrace for do. - - - - -	0 5 6
Ballrace for Back Axle 40 x 90 x 23 - - -	1 1 0

SPARE PARTS FOR 15/20/09/10 H.P. CHASSIS.

DESCRIPTION.	PRICE.
ENGINE.	
Cylinders with Bolts and Cover but without fittings—per pair - - - - -	10 15 0
Crankshaft - - - - -	~~14 10 0~~ 17 10 0
Main Bearings—each - - - - -	0 14 0
Big end Bearings - - - - -	0 12 0
Piston complete - - - - -	1 16 0
Piston Ring—each - - - - -	0 3 0
Gudgeon Pin - - - - -	0 4 0
Connecting Rod - - - - -	2 4 9
Bush for same - - - - -	0 4 0
Main Pinion - - - - -	1 8 0
Washer (copper and asbestos) for valve in- spection cap—each - - - - -	0 0 4
Inspection Cap (exhaust or inlet) - - - - -	0 4 6
Compression Tap - - - - -	0 3 6
Exhaust Camshaft - - - - -	1 5 6
Inlet do. - - - - -	1 5 6
HALF-TIME GEAR.	
Valve Lifter with guide - - - - -	1 1 3
Valve Lifter Adjustable Screw - - - - -	0 2 9
Valve only (inlet or exhaust) - - - - -	0 7 0
Spring for do. - - - - -	0 1 6
Cup for do. - - - - -	0 1 0
Cotter for do. - - - - -	0 0 6
Fibre Ring, 56 teeth, for exhaust half-time wheel - - - - -	1 4 0
do. do. inlet do. - - - - -	1 4 0
Magneto Pinion - - - - -	0 16 0
Pump Pinion - - - - -	0 11 0
Advance Wheel Fibre Ring - - - - -	0 18 0
IGNITION.	
Bosch Sparking Plug - - - - -	0 3 6
Copper and Asbestos Washer for do. - - - - -	0 0 1
Insulated Wire—per foot - - - - -	0 0 5
Bosch High-tension Magneto DR 4 - - - - -	14 0 0
“ “ “ “ DU 4 - - - - -	10 10 0
WATER PUMP.	
Water Pump complete with Spindle and Pinion - - - - -	4 13 9
Centrifugal Wheel - - - - -	0 7 6

FIAT

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SPARE PARTS FOR 15/20/09/10 H.P. CHASSIS.

DESCRIPTION.	PRICE.
WATER PUMP—Continued.	£ s. d.
Pump Spindle with Key, Nut and Washers	0 4 0
Rubber Connections, 32 m/m—per inch	0 0 3
do. 24 m/m do.	0 0 3
CARBURETTOR.	
Jet Bottle and Bush	0 3 0
Jet	0 2 0
Petrol Filter and Casing	0 15 0
Float	0 4 6
Cover for Float Chamber (small)	0 4 3
do. do. (large)	0 4 3
Carburettor Needle and Governors (large)	0 4 0
do. do. (small)	0 4 0
Carburettor Needle (large)	0 2 6
do. (small)	0 2 6
OIL PUMP.	
Rotary Oil Pump with adjustable screw and connections	2 18 0
Oil Pressure Gauge	0 15 0
STEERING, &c.	
Steering Worm	1 16 0
Steering Quadrant	2 5 0
Coupling Bar	0 15 0
Cross Bar	0 19 5
Coupling Bar Pin	0 6 3
Cross Bar Pin	0 7 0
Front Axle only, without swivels	7 10 0
Hub Cap (front)	0 11 6
do. (back)	0 15 3
Swivel, nearside	2 10 0
Swivel, offside	2 10 0
GEAR BOX, DIFFERENTIAL, &c.	
Direct Drive Pinion (28 teeth)	1 5 6
3rd Speed Sliding Pinion with direct drive dog	2 0 9
3rd Speed Fixed Pinion (36 teeth)	1 12 4
2nd Speed Sliding Pinion	1 5 3
2nd Speed Fixed Pinion	1 17 3

SPARE PARTS FOR 15/20/09/10 H.P. CHASSIS.

DESCRIPTION.	PRICE.
GEAR BOX, DIFFERENTIAL, &c.	£ s. d.
—Continued.	
1st Speed Sliding Pinion	1 0 4
1st Speed Fixed Pinion	2 2 0
Reverse Pinion	0 15 6
Differential Shaft Bevel (24 teeth)	7 12 6
Star Pinion	1 18 3
Transmission Shaft Bevel (14 1/2")	2 14 6
Crown Bevel (57 teeth)	~~5 8 6~~ 7 12 6
CLUTCH.	
Clutch Discs (large)—each	0 0 9
do. (small) do.	0 0 9
Clutch Spring	0 7 6
Clutch Casing	1 12 0
Clutch Cover	0 18 0
Clutch Shaft	1 10 0
BRAKES.	
Sidebrake Liners—per pair	0 12 0
Footbrake Liners—per pair	0 12 0
RADIATOR.	
Radiator complete	20 0 0
Radiator Cap	0 5 0
PETROL SUPPLY.	
Petrol Tank complete	3 15 0
Petrol Tank Cap	0 17 0
Pressure Gauge	~~0 15 9~~ 16/-
BALLRACES.	
Direct Drive Pinion Ballrace 110 x 50 x 27	1 10 0
Sliding Shaft Ballrace (front) 35 x 80 x 21	0 18 6
do. do. (back) 17 x 62 x 17	0 14 6
Constant Drive Shaft Ballrace (front)	
do. do. 30 x 72 x 19	0 15 0
do. do. (back) 30 x 72 x 19	0 15 0
Transmission Shaft Bevel Ballrace (large)	
do. do. 55 x 120 x 29	1 14 6
do. do. (small) 20 x 52 x 15	0 11 9
Differential Shaft Ballrace 50 x 110 x 27	1 10 0
Differential Casing Ballrace 60 x 110 x 22	1 6 0

FIAT

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SPARE PARTS FOR 28/35 H.P. CHASSIS.

DESCRIPTION.	PRICE.
ENGINE.	
Cylinders with Bolts and Cover but without fittings—per pair	£ s. d. 15 10 0
Crankshaft	26 10 0
Main Bearings	0 12 0
do.	0 13 0
do.	0 14 6
Big end Bearings	0 14 0
Piston complete	2 18 0
Piston Ring—each	0 3 6
Gudgeon Pin	0 4 6
Connecting Rod complete	2 8 0
Bush for same	0 4 6
Main Pinion	1 12 0
Washer (copper and asbestos) for valve inspection cap—each	0 0 4
Inspection Cap (exhaust or inlet)	0 6 6
Compression Tap	0 3 6
Inlet Camshaft	11 0 0
Exhaust Camshaft	9 0 0
Valve Lifter with Guide (G.M.)	1 1 0
Valve Lifter and Guide (Steel)	1 10 0
Valve Lifter Adjustable Screw	0 3 6
Valve only (inlet or exhaust)	0 7 6
Valve Spring	0 2 0
do. Cup	0 1 6
do. Cotter	0 0 6
Fibre Ring for inlet half-time wheel	1 9 0
Fibre Ring for exhaust do.	1 9 0
Magneto Pinion complete	2 10 0
Pump Pinion	0 16 0
Advance Wheel Fibre Ring	0 19 0
IGNITION.	
Bosch Sparking Plug	0 3 6
Copper and Asbestos Washer for do.	0 0 1
Insulated Wire—per foot	0 0 5
Bosch High-tension Magneto DR 4	14 8 0
WATER PUMP.	
Water Pump complete with Spindle	5 0 0
Centrifugal Wheel	0 12 0
Pump Spindle with Key, Nut and Washers	0 6 6
Rubber Connections, 32 m/m—per inch	0 0 3
do. 24 m/m do.	0 0 3

SPARE PARTS FOR 28/35 H.P. CHASSIS.

DESCRIPTION.	PRICE.
CARBURETTOR.	
Jet	£ s. d. 0 2 0
Jet Baffle	0 6 6
Petrol Filter and Casing	1 2 0
Float	0 4 9
Cover for Float Chamber	0 4 6
Support with Governors for Carburettor Needle	0 2 6
Carburettor Needle	0 2 6
OIL PUMP.	
Rotary Pump with adjustable screw and connections	4 0 0
Oil Cock	0 9 6
STEERING, &c.	
Coupling Bar	2 12 0
Cross Bar	1 16 0
Steering Worm	2 15 0
Steering Quadrant	2 10 0
Steering Arm (nearside)	1 6 0
Steering arm (offside)	0 12 0
Front Axle only without swivels	7 10 0
Hub Cap, front	0 11 6
do. back	0 15 0
Swivel (nearside)	4 7 0
do. (offside)	4 7 0
GEAR BOX, DIFFERENTIAL, &c.	
Direct Drive Pinion	3 5 0
3rd Speed Sliding Pinion with direct drive dog	2 8 0
3rd Speed Fixed Pinion	2 1 0
2nd Speed Sliding Pinion	1 14 0
2nd Speed Fixed Pinion	2 13 0
1st Speed Sliding Pinion	1 8 0
1st Speed Fixed Pinion	3 2 0
Reverse Pinion	1 17 0

FIAT

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SPARE PARTS FOR 28/35 H.P. CHASSIS.

DESCRIPTION.	PRICE
GEAR BOX, DIFFERENTIAL, &c.	
—Continued	
Differential Shaft Bevel (22 teeth) - - - -	£ s. d. 2 5 0
Star Pinion (14 teeth) - - - -	1 14 0
Crown Bevel (46 teeth) - - - -	~~4 15 0~~ 7. 5. 0.
Transmission Shaft Bevel (15 teeth) - -	~~1 15 0~~ 3. 14. 0.
CLUTCH.	
Clutch Discs (outside)—each - - - -	0 1 0
do. (inside) do. - - - -	0 1 3
Clutch Spring - - - -	0 6 6
Clutch Cover - - - -	0 18 0
Clutch Casing - - - -	3 5 0
BRAKES.	
Footbrake Liners—per pair - - - -	0 14 0
Sidebrake Liners do. - - - -	0 14 0
RADIATOR.	
Radiator complete - - - -	26 0 0
Radiator Cap - - - -	0 12 0
PETROL SUPPLY.	
Petrol Tank complete - - - -	4 12 0
Pressure Gauge (disable) - - - -	1 12 0
BALLRACES.	
Cardan Shaft Ballrace 40 × 90 × 23 - - -	1 1 0
Direct Drive Ballrace 100 × 45 × 25 - -	1 8 0
Sliding Shaft Front Ballrace 35 × 80 × 21 -	0 18 6
Transmission Shaft Front Ballrace 40 × 72 × 15	0 14 0
Back Sliding Shaft Ballrace 17 × 62 × 17 -	0 14 6
Differential Ballrace 55 × 120 × 29 - - -	1 14 6
Differential Shaft Ballrace - - - -	1 8 9
Transmission Shaft Ballrace (differential end) 20 × 52 × 15 - - - -	0 11 9
Differential Thrust Pallrace - - - -	0 5 0
Transmission Shaft Thrust Ballrace - - -	0 6 0
Pump Spindle Ballrace 42 × 15 × 13 - - -	0 10 0

N.B.—Wherever possible clients are requested to send old or broken parts when giving an order for renewal, to facilitate dispatch.

FIAT

PRICES OF "FIAT" OILS AND GREASE.

Fiat Engine Oil - - - -	4/- per gallon tin.
" Clutch Oil - - - -	4/6 " " "
" Gear Oil - - - -	4/- " " "
" Grease - - - -	9d. per lb. in 7 lb. tins.

Prices of the above in bulk may be had on application.

RAILWAY CHARGES FOR MOTOR VEHICLES.

No petrol or inflammable liquid or vapour must be carried either in tank or elsewhere.

General charge:—6d. per mile per car at owner's risk, with minimum charge of 7s. 6d.; 25 per cent. added if at Company's risk, by passenger train.

Maximum weight allowed, 50 cwt., by passenger train.

Covered trucks cost 5s. extra up to 50 miles, and 10s. beyond, by passenger train.

GOODS TRAIN RATES FOR MOTOR CARS.

(Station to Station.)

Miles.	Weight up to 1 Ton.	Each extra 1 Ton.
	£ s. d.	£ s. d.
10 - - -	0 7 7 -	0 1 6
50 - - -	1 7 7 -	0 8 2
100 - - -	2 1 6 -	0 13 10
250 - - -	4 1 6 -	1 9 6
500 - - -	7 8 2 -	2 15 6

Old cars sent to the makers to be exchanged for new ones are carried at owner's risk for half rates, minimum charge 3s. 9d., but the exchange must be made within three months and the conveyance be between the same places.

FIAT

ROAD SIGNS UNDER THE MOTOR ACT, 1903.



Ten miles or lower limit of speed:—A round white ring, 18 inches in diameter, with plate giving limit in figures.



Prohibition:—Red solid disc, 18 inches in diameter.



Caution, Dangerous Corners, Cross Roads, or Precipitous Places:—Hollow red equilateral triangle.



All other notices under the Act to be on diamond-shaped boards.

All notices to be on one side of the road and approaching driver; and all Prohibition or Caution Boards to be 50 yards from the spot to which they apply.

MOTOR REGISTRATION, &c.

	£	s.	d.
Registration - - - - -	1	0	0
Changing Ownership - - - - -	0	5	0
Driving License, renewable annually - - - - -	0	5	0
Replacing Lost or Defaced License - - - - -	0	1	0
Male Servant's License, renewable annually - - - - -	0	15	0

LIST OF FIAT AGENTS.

ENGLAND AND WALES.

LANCASHIRE, NORTH WALES & CHESHIRE } Sole Agent—James W. Haworth, A.M.I.E.E.,
23 Bootle St., Deansgate, Manchester.

District Agents under James W. Haworth's Agency—

LIVERPOOL AND DISTRICT } The Liverpool Motor House Ltd., 7-11 Peter's Lane, Church Street, Liverpool.

OLDHAM - - - - - } The Oldham Motor Co., Ltd., 36 Manchester Road, Oldham.

WIGAN - - - - - } H. H. Timberlake, 6 King's Street, Wigan.

PRESTON - - - - - } Merigold Bros., 147 Church Street, Preston.

YORKSHIRE - - - - - } A. B. Wardman & Son, Ltd., Cambridge St., Harrogate.

NORTHUMBERLAND, DURHAM AND CUMBERLAND - - - - - } R. E. Hale & Co., 27 Pilgrim St., Newcastle-on-Tyne.

WARWICKSHIRE AND NORTHAMPTONSHIRE } Pychley Autocar Co., Ltd., Sheep Street, Northampton.

Sub-Agents for Warwickshire } Langford & Co., Leamington.

LEICESTERSHIRE - - - - - } H. A. Hamshaw, 37 Humberstone Gate, Leicester.

KENT - - - - - } The Autocar Co., Woodbury Park Road, Tunbridge Wells.

ISLE OF THANET - - - - - } A. W. Bangham, 20 Cecil Square, Margate.

NOTTINGHAMSHIRE - - - - - } A. R. Atkey & Co., Ltd., Trent Street, Nottingham.

SUSSEX - - - - - } Fiat Garages, 105 St. James Street, Brighton.

HAMPSHIRE (with the exception of Bournemouth and District) } G. H. Cox & Co., Ltd., 40, 41A and 57 Castle Road, Southsea.

GLAMORGANSHIRE AND MONMOUTHSHIRE } Hill's Garage, Westgate Street, Cardiff.

DORSET (including Bournemouth and District) - - - - - } Motor Mac's Garage, 35 Holdenhurst Road, Bournemouth.

FIAT

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LIST OF FIAT AGENTS—continued.

SCOTLAND.

LANARK, Ayr, PERTH, } ARGYLL AND BUTE }	Rennie & Prosser, Ltd., 95 Mitchell Street, Glasgow.
EDINBURGH AND MIDLOTHIAN - - - }	James Ross & Co., 6 Gilmour Place, Edinburgh.
ELGINSHIRE, BANFF- SHIRE & INVERNESS- SHIRE - - - - }	Alexander Paterson, City Cycle and Motor Works, Elgin.

IRELAND.

IRELAND (with excep-) tion of Belfast) - - }	Browne & Ramsay, 134 Lower Baggot Street, Dublin.
BELFAST - - - - -	S. P. Corry, Ulster Motor Works, 53 Donegal Street, Belfast.

BRITISH INDIA.

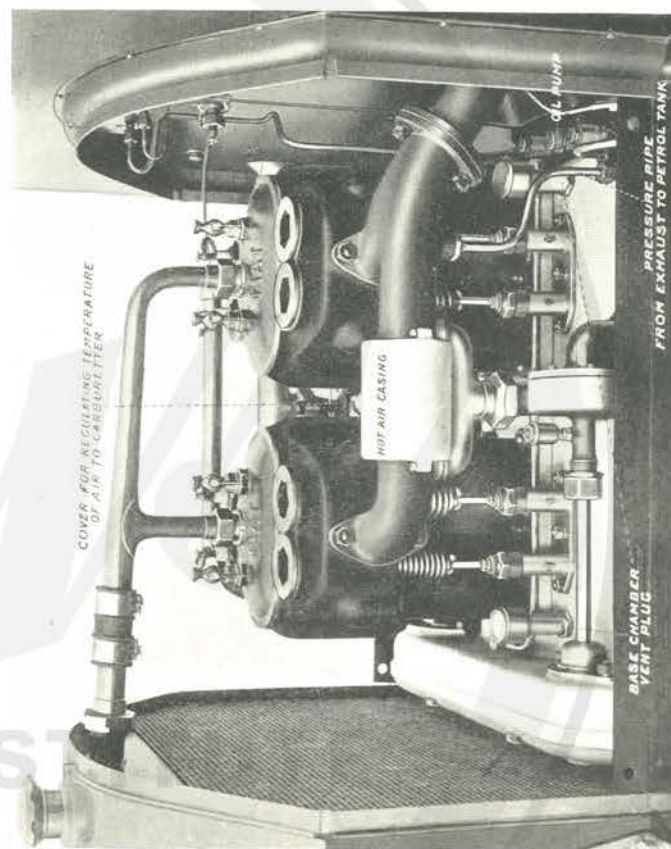
BRITISH INDIA - - -	The Bombay Motor Car Co., Ltd., 11 Elphin- stone Circle, Bombay.
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AUSTRALIA.

SOUTH AUSTRALIA - -	Eyes & Crowle, 125 and 127 Pirie Street, Adelaide.
VICTORIA - - - -	The Tarrant Motor Co., 104-12 Russell Street, Melbourne.
NEW SOUTH WALES -	Garratts Ltd., 173-175 Elizabeth Street, Sydney.

NEW ZEALAND.

NEW ZEALAND - - -	W. B. Scott & Co., 149 Manchester Street, Christchurch.
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15/20 H.P. FIAT ENGINE. EXHAUST SIDE.

FIAT

FIAT

MEMORANDA.

License No.....

Registration No.....

H.P.

Name..... FIAT

Weight unladen

Cylinders:

Size of Back Tyres:.....

„ Front „

Insurance Policy No.

.....

Name

Address.....

FIAT

INSTITUTE

