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MODEL 500 C CAR

- Leading features
- Driving the car
- Maintenance
- Belvedere Station Wagon and Delivery Van

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2nd EDITION

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FOREWORD

This book has been divided into four parts, each of which has well defined limits corresponding to a systematic subdivision of the subject matter, so that the information needed can be easily and quickly found, avoiding overlapping and unnecessary repetition.

In the first part are gathered all the data which it is necessary to consult at least once in order to gain a good knowledge of the car.

The second part is more particularly addressed to the novice, giving instructions for the general use of a car, with special reference to model **500 C.**

The third part comprises the fundamental rules of maintenance, upon the practical following out of which depends the regular and satisfactory working of the car, as well as its economical and long life. Included in these rules are also those concerning the more important inspections and adjustments, which it is the duty of the **Service Station** to carry out, but which are here briefly set forth with a twofold purpose: 1) to guide those who, having the ability and possessing the necessary equipment, prefer to do these jobs themselves; 2) for those who, finding themselves at a distance from a **Fiat Service Station,** desire to be able to check the work of the mechanic to whom they have exceptionally to entrust the work.

Finally in the fourth part there are described the characteristics of the **Delivery Van,** of the **Belvedere Station Wagon** and differences of both with respect to the standard **Saloon.**

We thus consider that this handbook will answer the most varied needs of the vast circle of **500 C** Owners.

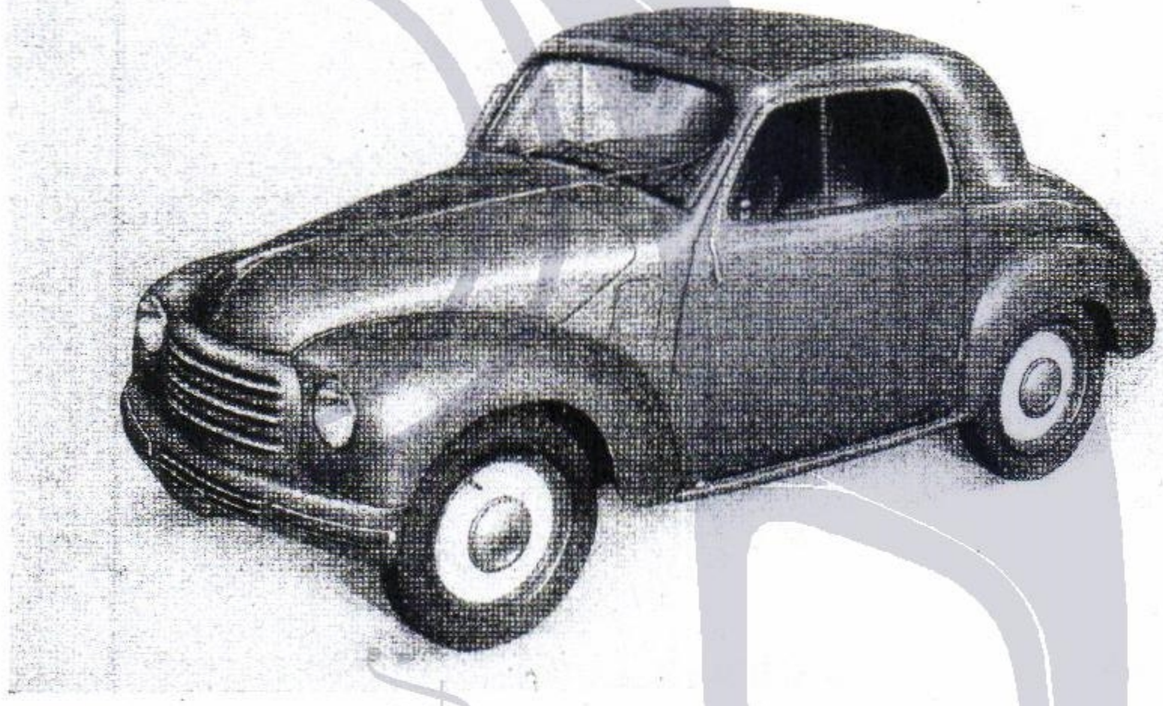

Fig. 1. - The **Mod. 500 C convertible Saloon.**

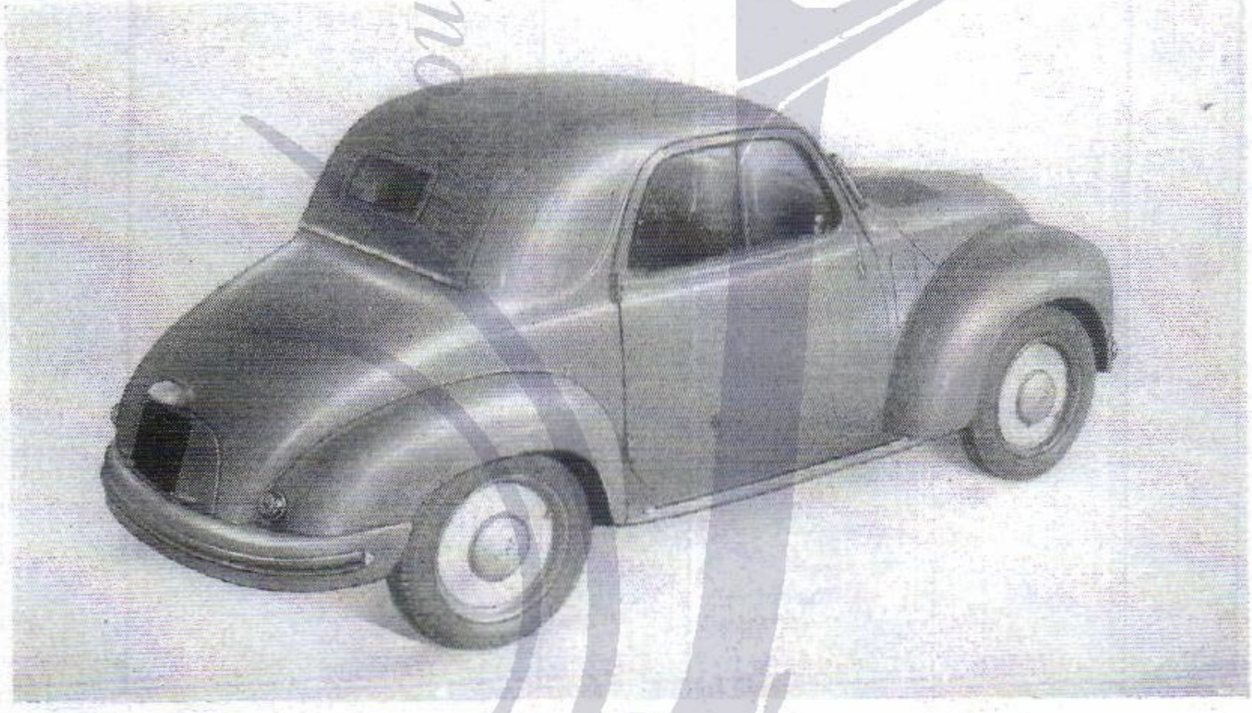

Fig. 2. - The **Mod. 500 C convertible Saloon.**

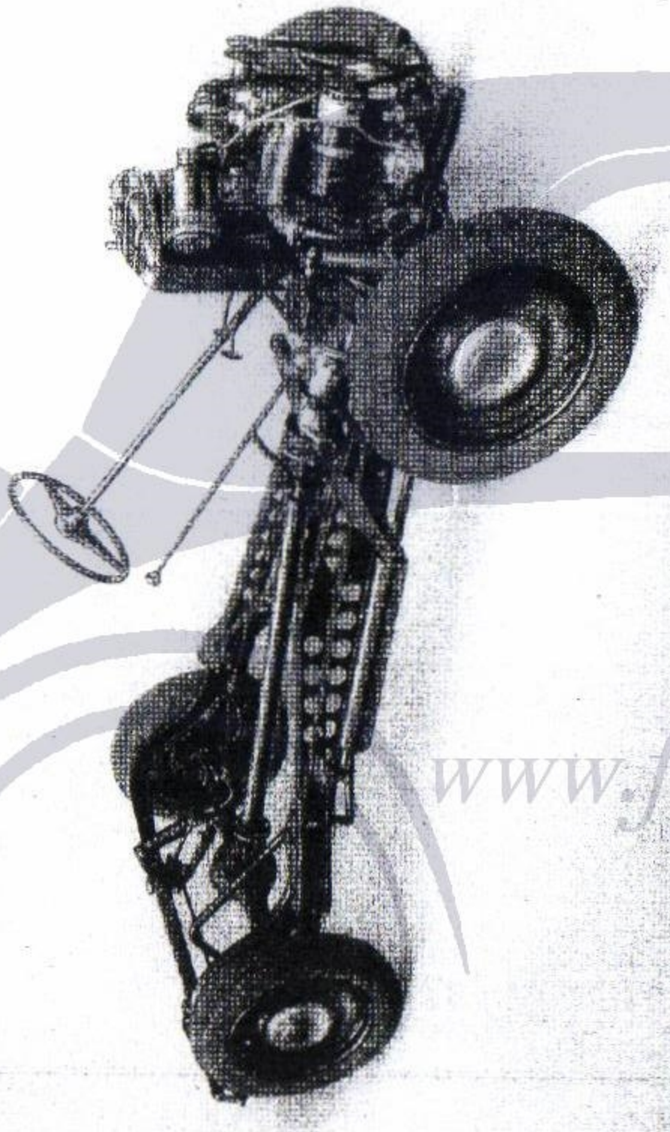

Fig. 3. - The Model 500 C chassis.

Both for those operations which are not easily carried out by the private Owner, and for partial or general overhauls, we strongly recommend the Owner, in his own interest, to take the car to one of the **Service Stations which the Fiat has established both in Italy and abroad for the best assistance to Fiat Owners.** In them all classes of repair and overhaul work are carried out in a rational manner, with economy and dispatch, thanks to specially trained staffs and methods and equipment specially designed for such service.

SPARE PARTS. — The most satisfactory running of the car will be obtained only if genuine **FIAT** spare parts are employed for replacements. **When ordering spare parts, the chassis and engine numbers must be specified besides the car model and the part number.**

IDENTIFICATION NUMBERS

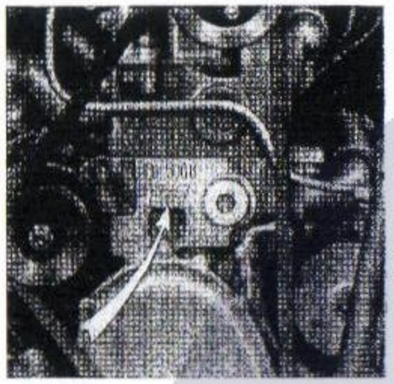

Fig. 4.
Engine identification number.

Stamped in front of the cylinder-block, close to the cylinder head.

Fig. 5.
Chassis identification number.

Stamped on the upper right-hand part of the annular front cross member.

Fig. 6.
Manufacturer's plate, where chassis and engine numbers are repeated.

Placed on the rear wall of the hood, to the right, close to the gasoline filler plug.

PRECAUTIONS DURING RUNNING IN

A rational running in, particularly of the engine, demands a moderate speed according to the following limitations.

DURING THE FIRST 900 MILES (1500 km).

— Do not run by any means for long periods at the maximum permissible speeds;

— Do not travel for long periods with the accelerator pedal trodden all down, particularly up-hill;

— At the starting let the engine warm up slowly, avoiding to attain a very great number of revolutions per minute

Mileage	Max. allowed speeds (in miles)			
	in bottom gear	in 2nd gear	in 3rd gear	in top gear
from 0 to 125	8	13 1/2	21 1/2	37
from 125 to 450	9	16	25 1/2	42
from 450 to 900	10 1/2	17	27	45

Kilometers	Max. allowed speeds (in kilometers)			
	in bottom gear	in 2nd gear	in 3rd gear	in top gear
from 0 to 200	13	22	35	60
from 200 to 700	15	26	41	70
from 700 to 1500	17	28	44	75

In order to prevent exceeding the speed given for top gear, the carburetor is fitted with a diaphragm which must only be unsealed and removed by one of our Agents after the first

900 miles (1500 km). This diaphragm does not prevent the above speeds being exceeded on the level or on a slight down gradient, and therefore it is in the Driver's interest to make judicious use of the accelerator in such cases.

Even after the limiting diaphragm has been removed, although the Driver is free to make use of the full power of the engine, it is strongly recommended to run at least another 900 miles before driving the car at its top speed.

During the first 1800 miles (3000 km) abstain from travelling for long stretches uninterruptedly at top speed as it might happen on autoroads.

It must be borne in mind that the longer the period of limited speed, the longer the car will last.

REPLACEMENT OF ENGINE OIL

When the engine is new, as well as in the event it has been thoroughly overhauled, the oil replacement should take place after the first 300 miles (500 km).

MISCELLANEOUS

After the first 300 miles (500 km) there should be checked:

a) the tightness of the nuts that fix the cylinder head, the engine being cool;

b) the tightness of the bolts that fix to the chassis frame the rubber blocks for suspension of the engine-and-clutch unit;

c) the tightness of the nuts that fix the wheels.

LEADING FEATURES

ENGINE

Engine, clutch and gearbox in single unit, supported at three points on rubber cushions.

Engine model	500 B
Number of cylinders	4
Bore and stroke	mm 52 × 67
Cubic capacity	cc 570
Compression ratio	6,45
Brake horse power	16,5
Corresponding speed	r. p. m. 4400

Cylinder block and crankcase of wear resisting cast iron. Aluminium cylinder head, with valve seat inserts. Large diameter crankshaft supported on two bearings. I section connecting rods of special steel. Aluminium alloy pistons. Sheet metal sump, easily detachable.

The engine and gearbox assembly is easily taken out of the chassis by simply slipping it out from the front.

VALVE GEAR

Overhead valves actuated through pushrods and rockers from the camshaft in the crankcase. The camshaft is driven by a silent roller chain, situated at the front end in a casing.

Valve timing—with theoretical adjustment of .007" (0,17 mm) clearance between valve stem and tappet:

Intake	Beginning: before t. d. c.	15°
	End: after b. d. c.	55°
Exhaust	Beginning: before b. d. c.	55°
	End: after t. d. c.	15°

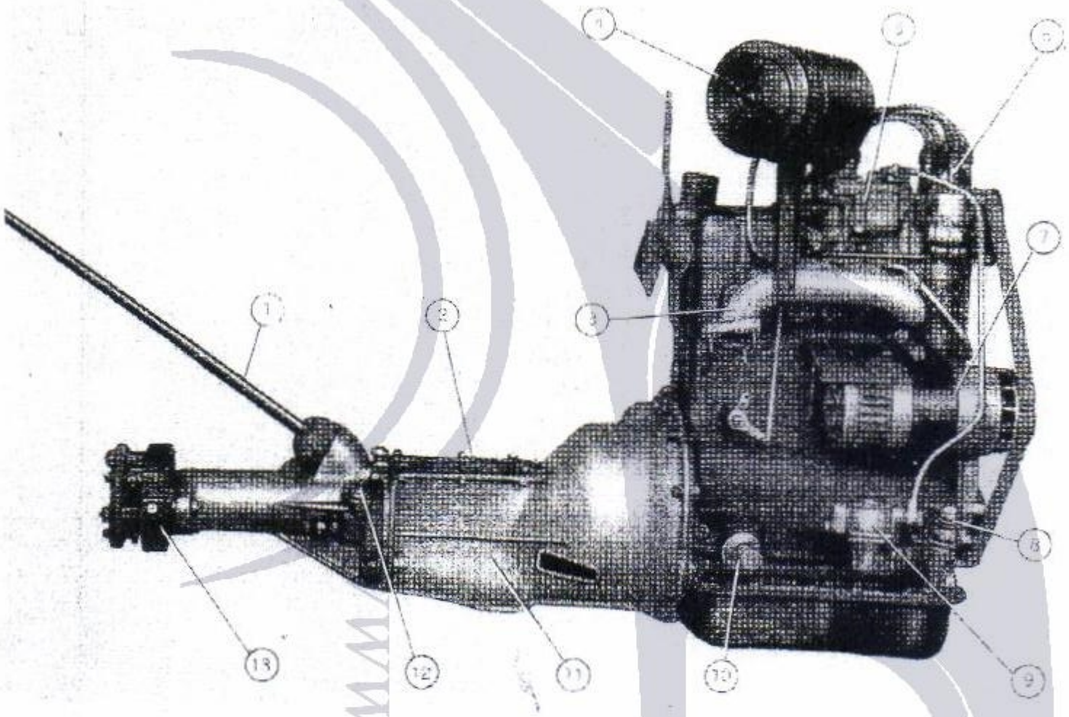

Fig. 7. - Engine-gearbox unit viewed from the right.

1. Gear lever. - 2. Gear box upper cover. - 3. Exhaust and intake manifold. - 4. Air cleaners, with filtering cartridge of steel wool. - 5. Carburetor. - 6. Ignition distributor. - 7. Dynamo. - 8. Delivery filter. - 9. Fuel pump. - 10. Stud supporting in front the engine-gear box unit. - 11. Gear box. - 12. Drive coupling for speedometer transmission. - 13. Brake on the transmission.

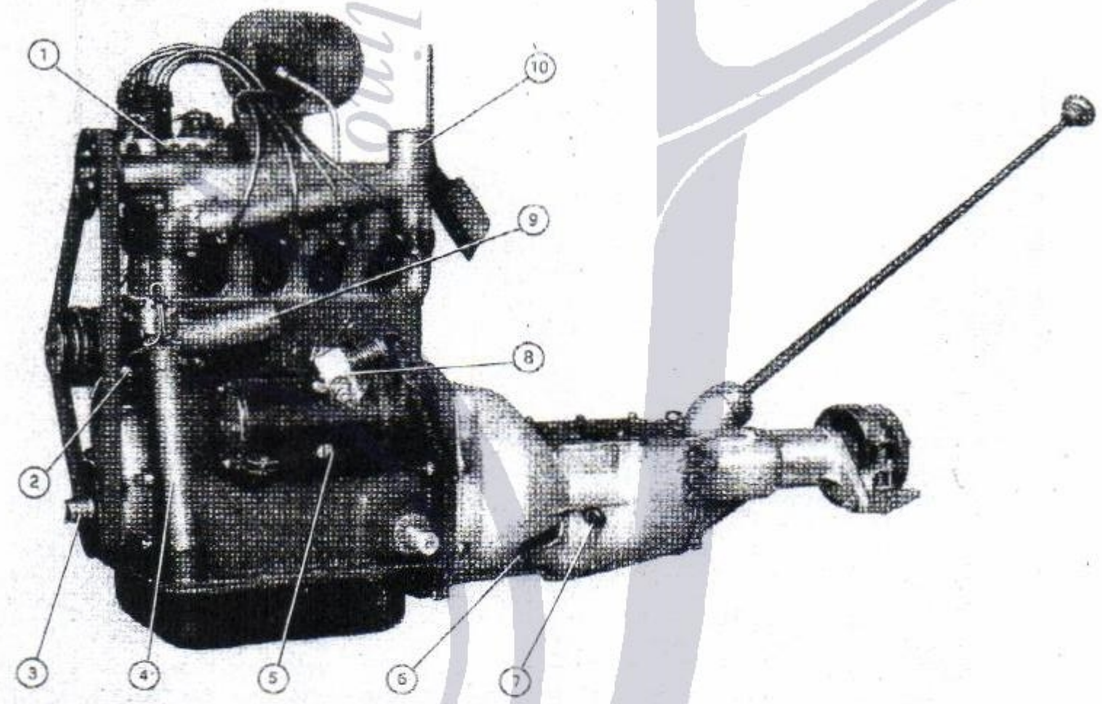

Fig. 8. - Engine-gearbox unit viewed from the left.

1. Oil filler plug. - 2. Water drain plug for cylinder jackets. - 3. Claw coupling for hand starting. - 4. Oil breather pipe, with plug and dip stick. - 5. Starter. - 6. Clutch withdrawl lever. - 7. Gear box filler plug. - 8. Starter switch. - 9. Water intake pipe for cylinder jackets. - 10. Outlet pipe for cooling water from cylinder jackets.

Actual clearance between valve and rocker when engine is cold: .006" (0,15 mm) both for intake and exhaust valves.

INTAKE MANIFOLD

This is partially connected to the exhaust manifold so as to warm up the mixture as soon as the engine starts running.

DOWNDRAUGHT CARBURETOR

Weber, model 22 DRS, fitted with easy starting device controlled from the dash by means of a knob. The air intake is fitted with a steel wool filter and a silencer.

Adjusting data of the carburetor:

Choke tube	. . . . .	diameter	15,5 mm
Main jet	. . . . .	»	0,92 »
Slow running jet	. . . . .	»	0,45 »
Pilot jet	. . . . .	»	1,05 »

FUEL SYSTEM

The carburetor is fed by a mechanical pump that draws from the tank on the dash. It is fitted with a demountable filter and is driven by the oil pump drive shaft, which is driven by the camshaft. The tank is fitted with a suction filter and electric level gauge, the dial of which, on the instrument board, lights up when the fuel level falls below reserve limits (5 lt).

LUBRICATION

is forced by means of a gear pump driven by the camshaft and fitted with a suction filter submerged in the sump.

Delivery filter on the right side of the crankcase, easily demountable for cleaning and fitted on top with a pressure relief valve that can be adjusted from without.

Dip stick for checking the oil level to the left of engine and filler plug on the cylinder head cover.

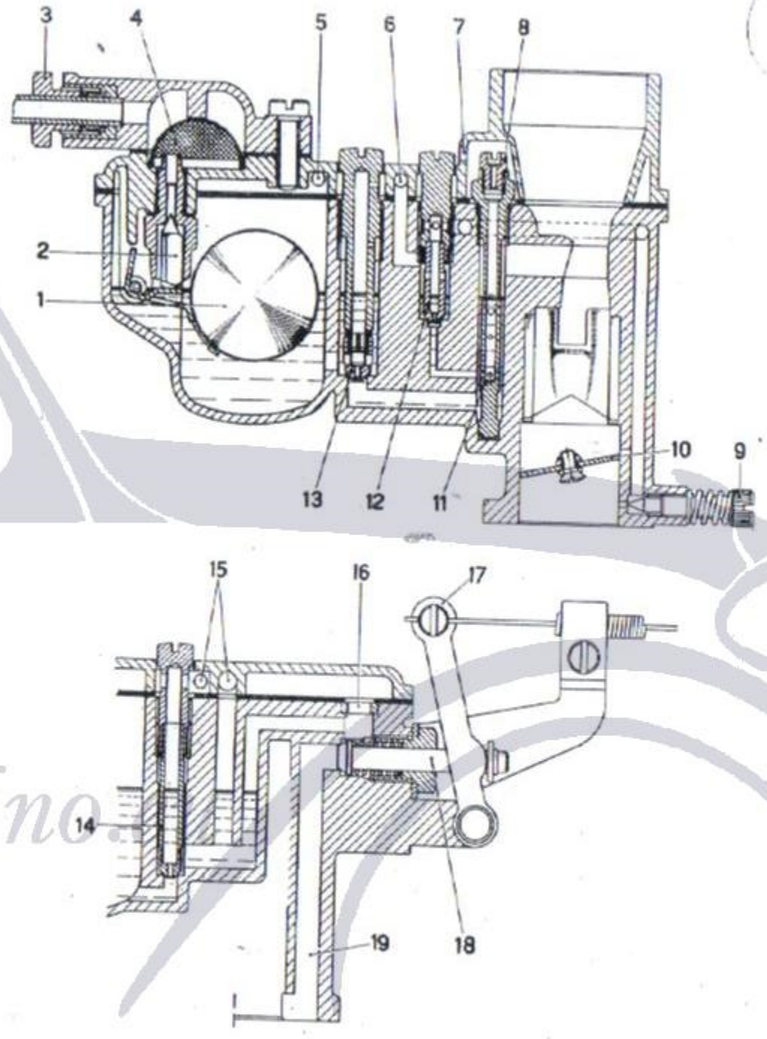

Fig. 9. - Carburetor Weber 22 DRS.

1. Float. - 2. Needle valve. - 3. Nut for fixing fuel delivery valve. - 4. Filter. - 5. Air intake for bowl. - 6. Air intake for jet 12. - 7. Air intake for emulsion well. - 8. Check screw for emulsion well air. - 9. Adjusting screw for idling mixture. - 10. Throttle. - 11. Emulsion well. - 12. Jet for idling. - 13. Main jet. - 14. Pilot jet. - 15. Air intake for pilot jet. - 16. Additional air intake for pilot jet. - 17. Starting device control jet. - 18. Valve for starting device. - 19. Starting mixture passage.

Forced circulation of filtered air within the crankcase by means of pipes connected to the air intake for the carburetor (fig. 24).

The standard oil pressure is 35 lbs. p. sq. in. (2,5 kg/cm²).

COOLING

Water is circulated on the thermo-syphon principle through a vertical tube radiator fitted with air deflectors. The radiator is mounted behind the engine and is cooled by a fan, the spindle of which passes through the cylinder head cover and is driven by a belt adjustable for stretch.

Side roll curtain for protection in winter, arranged behind the grill, and hand controlled.

The radiator filler cap is situated in front under the bonnet, and the drain plug in front of the cylinder block.

IGNITION

by coil and battery with distributor driven by a vertical spindle driven off the camshaft. The coil is mounted on the right side of the hood.

The ignition switch is actuated by pushing right down the key in the external lighting commutator on the instrument board.

Firing sequence	1-3-4-2
Initial advance *	10°
Automatic advance	30°
Total maximum advance	40°
Contact breaker gap	.019" to .021" (0,47 to 0,53 mm)
Spark plug gap	.020" to .024" (0,50 to 0,60 mm)
Diameter and pitch of spark plugs	14×1,25 mm

STARTING

by electric motor, controlled by a knob on the dash. Emergency starting by hand.

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* The initial advance can be reduced down to 5° according to the kind of gasoline.

Fig. 10. - Gear box, transmission and rear axle unit.
1. Rear axle. - 2. Flexible joints for transmission. - 3. Tubular propeller shaft. - 4. Exhaust silencer. - 5. Brake on the transmission. - 6. Gear box.

TRANSMISSION

CLUTCH

Single plate with flexible hub and asbestos fabric ring facing, working dry. Pedal travel adjustable by unscrewing the control rod.

GEARBOX

4 speeds and reverse, with silent third and synchromesh gears for the quick engagement of the 3rd and 4th speeds. Easily detachable top cover for eventual inspection. Oil filler plug on left side. Central control lever.

The gear ratios are as follows:

1st speed	1 to 4,480
2nd »	1 to 2,730
3rd »	1 to 1,705
4th »	1 to 1
Reverse	1 to 5,680

PROPELLER SHAFT

tubular, fitted with flexible joints at the ends and sliding sleeve on front end.

REAR AXLE

of pressed steel. Final drive through bevel helical gears. Differential mounted on ball bearings. Driving pinion adjustable for backlash from outside. Oil filler cap on rear cover.

Torque and thrust are taken up by the semi-elliptic springs of the rear suspension.

Standard ratio . . . . . 8 to 39

Cars destined for use in mountainous country are fitted upon request with a 8-to-41 rear axle ratio.

NOTE. — The ratio actually fitted is stamped on the differential bracket.

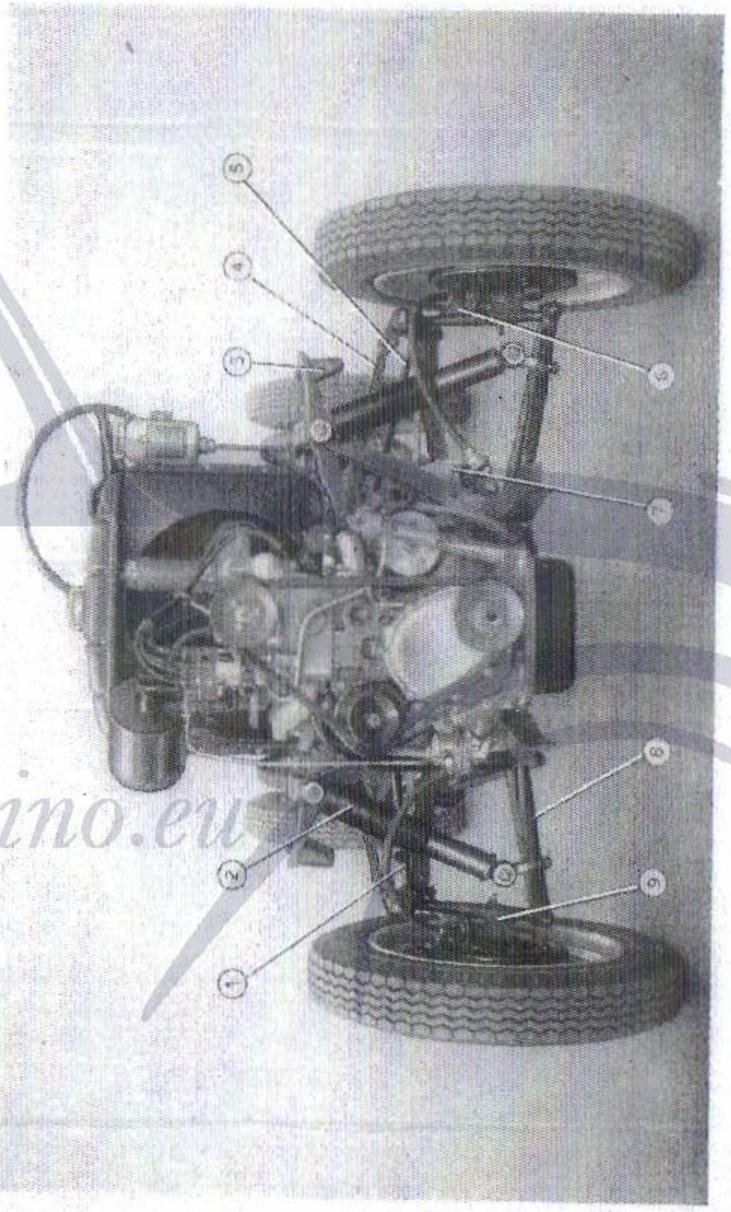


Fig. 11. - Front springing and steering.

1. Sleeve on the track rod for adjusting the wheels convergence. - 2. Double acting hydraulic shock absorber. - 3. Rubber block for limiting the flexion of the road spring. - 4. Transverse semi-elliptic spring. - 5. Nearside track rod. - 6. Steering box. - 7. Steering arm on steering knuckle. - 8. Swinging radius. - 9. Upright arm of steering knuckle pillar.

CHASSIS

Wheelbase	6' 6 3/4" (2,000 m)
Front track	3' 7 5/8" (1,116 m)
Rear track	3' 6 15/16" (1,083 m)

FRAME

of pressed steel, stiffened by a cruciform crossbracing member prolonged till the front member. This is annular to give a passage to the engine-and-gearbox unit, and carries the semi-elliptic suspension spring. The brackets projecting from the side members are for fixing the coach work.

FRONT SUSPENSION

Wheels independently sprung, with a variable-flexibility semi-elliptic spring, transversal to the frame, and triangular swinging radii articulated to brackets on the side members. All the articulations are fitted with grease gun nipples.

Buffer blocks for limiting the flexion of the spring.

Telescopic, double-acting hydraulic shock absorbers with rubber bearing for the articulation pins.

REAR SPRINGING

by semi-elliptic springs, the flexibility of which varies with the load, fixed to the side members. Telescopic, double-acting hydraulic shock absorbers and rubber buffers. The articulations of the springs and the shock absorbers are fitted with rubber bearings.

Rear sway bar for preventing the car from side rolling at the curves.

STEERING

The steering control is by worm and worm sector mounted on roller bearings. Standard steering left hand; right hand steering optional. Play between worm and sector easily taken up. Independent steering rods to each wheel, with ball joints and adjusting sleeve for correcting the toe-in of the wheels. The joints and the steering box are fitted with grease gun nipples.

Minimum turning radius . . . . . 14' 4" (m 4,35)

BRAKES

of the expanding type, controlled hydraulically through a special master-cylinder and wheel cylinders with double piston, fitted to each wheel (Patent F. B.). The tank for the special brake fluid is fitted on the forward side of the dash.

Adjustment of clearance between brake shoes and drums is made by means of eccentrics on the housing flange.

An emergency brake is fitted on the transmission, actuated by a hand lever. The adjustment of clearance between the drum and the brake band is made by screwing up the pull rods and by a centring screw.

WHEELS

Disc wheels with well base rims are fitted . . . 15"×2,50"C

TYRES

low pressure . . . . . 4,25—15

ELECTRICAL EQUIPMENT

VOLTAGE . . . . . 12 Volts

DYNAMO

The 130-Watt dynamo is mounted on the right side of the engine and is driven off the crankshaft by an adjustable Vee belt.

Voltage automatical regulator, current limitator and automatic cut-out made into a single regulating unit, fixed at the back of the wall where is fastened the radiator. A warning light showing when the battery is not being charged because the

dynamo voltage drops below 12 Volts is fitted within the lock-and-key switch. The bulb is of 1,5 Watts.

Minimum speed for charging the battery, with lights out:

Engine, about . . . . . 900 r. p. m.
Car, in top gear, about . . 13 miles p. h. (20 km)

BATTERY

Marelli 6 V X 7, of 38 amp. hours capacity, housed at the rear on the near side, in a box under the floor, and easily accessible for inspection.

STARTING MOTOR

This is located on the left hand side of the cylinder block.

Engagement of the motor pinion with the flywheel crown is controlled, at the same time as the starting switch, by a pull knob on the dash. The pinion is fitted with free-wheeling device and is driven by the starter motor spindle through a couple of reduction gears.

LAMPS

The headlamps are sunk into the wings and fixed by means of a central stud, allowing of easy adjustment of the light beams, with bulb for town driving (5 Watts) and central double filament bulb for headlights (35 Watts) and for anti-dazzle lights (35 Watts).

Three 1,5-Watt bulbs for indirect lighting up of instrument board, with switch lever.

A lamp with a 3-Watt bulb and own lever switch is incorporated in the retrovisor mirror.

Tail light, fixed to the rear of the body work, with a 5-Watt bulb. Rear width lights, braking lights and refraction glasses, fixed to the wings, and fitted with double-filament 3-Watt bulbs (width lights) and 20-Watt bulb (braking light).

A plug-in connection for an eventual inspection lamp is provided under the facia board, on the left.

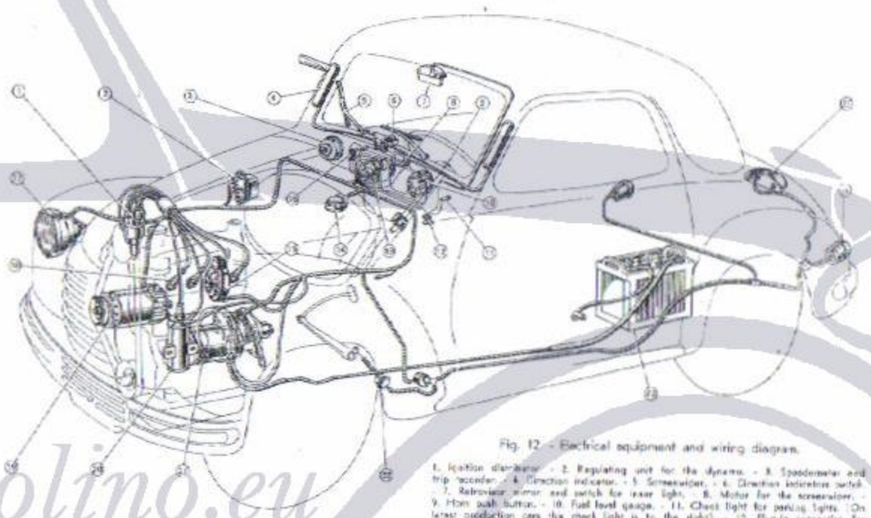


Fig. 12 - Electrical equipment and wiring diagram.

1. Ignition distributor. - 2. Regulating unit for the dynamo. - 3. Speedometer and trip recorder. - 4. Direction indicator. - 5. Screenwiper. - 6. Direction indicator switch. - 7. Retrovisor mirror and switch for inner light. - 8. Motor for the screenwiper. - 9. Horn push button. - 10. Fuel level gauge. - 11. Check light for parking lights. (On latest production cars the check light is to the right). - 12. Plug-in connection for inspection lamp. - 13. Outer lights commutator with ignition switch and dynamo charge indicator light. - 14. Control device for fuel level gauge. - 15. Horn. - 16. Screenwiper switch. - 17. Headlamps. - 18. Spark plugs. - 19. Dynamo. - 20. Ignition coil. - 21. Starting motor. - 22. Braking lights switch. - 23. Battery. - 24. Rear width lights, braking lights and catadioptrics. - 25. Tail light.

ACCESSORIES

These comprise an electric horn mounted on the nearside of the cowl, with push button switch on the steering wheel.

Screen wiper with switch on the dash board.

Direction indicators (with 3-Watt bulbs) fitted on the sides of the windscreen and mechanically controlled by a handle located on the upper edge of the facia board.

Check light (1,5-Watt bulb) on the fuel level indicator warning when tank has but a last reserve of gasoline.

Green warning light (1,5 Watt bulb) for the parking lights.

Driving mirror and two inside sun visors.

FUSES

The two 8-Amp. fuses protecting the installation, situated behind the external lights switch, serve respectively:

— the right-hand fuse for the offside headlamp, the anti-dazzle lights, the town lights, the horn, the lamp incorporated in the retrovisor mirror, the connection for the inspection lamp and the lamp for indirect lighting up of the instrument board;

— the left-hand fuse for the nearside headlamp, the rear width lights, the tail and braking lights, and the screenwiper.

Another 8-Ampere fuse on the wire for the fuel level gauge, protects the direction indicators and the fuel level gauge together with its lamp.

Even when the fuses are burnt or removed, the circuits for the ignition, the starter and the battery charge with annexed red warning light remain active.

GAUGES AND CONTROLS

ON THE INSTRUMENT BOARD

From left to right:

— The accelerator control knob.
— The electric fuel gauge and the oil pressure gauge.
— Switch for indirect lighting of gauges and controls.

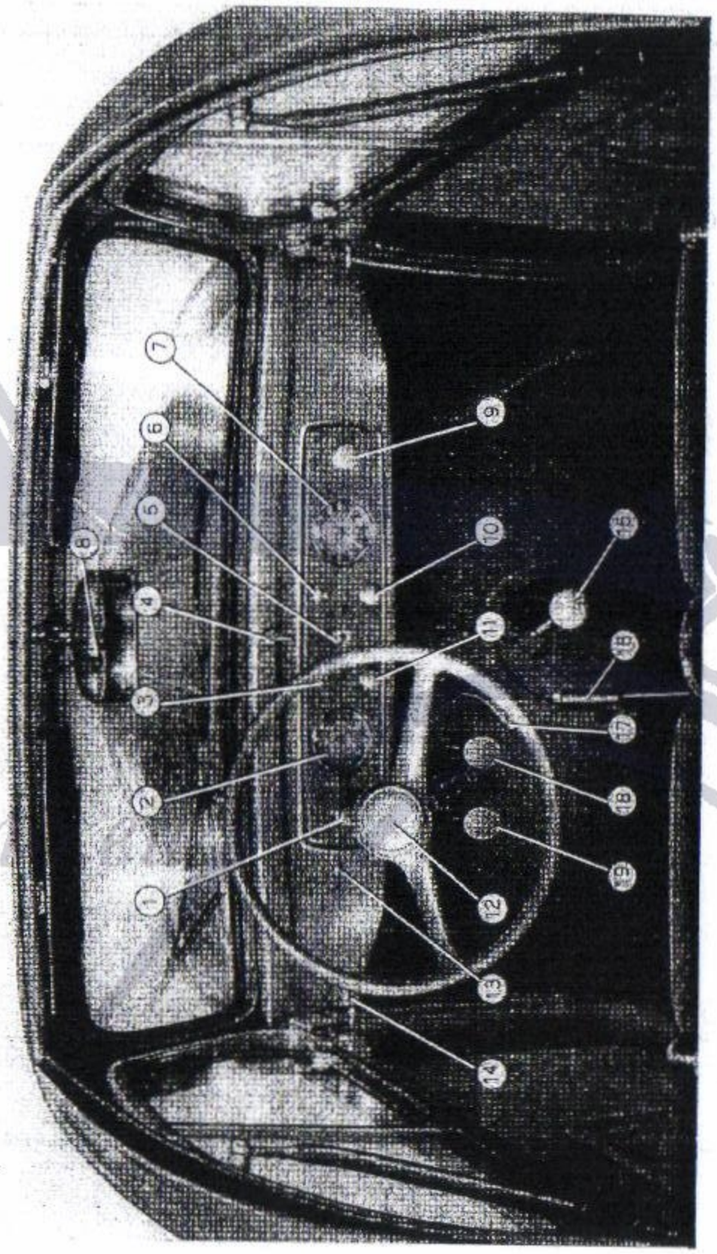


Fig. 13. - Instrument board and controls.

1. Accelerator control knob. - 2. Fuel level and oil pressure gauge. - 3. Lever switch for indirect lighting of instrument board. - 4. Direction indicators commuting switch. - 5. Commuting switch for outer lighting and ignition. - 6. Screenwiper switch. - 7. Speedometer and tripdometer. - 8. Inner lighting switch. - 9. Turning knob for heating apparatus. - 10. Knob for carburetor easy start device. - 11. Starter control knob. - 12. Horn push button. - 13. Tell-tale light for parking lights. - 14. Actuating knob for the bonnet catch. - 15. Gear lever. - 16. Hand brake lever. - 17. Accelerator pedal. - 18. Brake pedal. - 19. Clutch pedal.

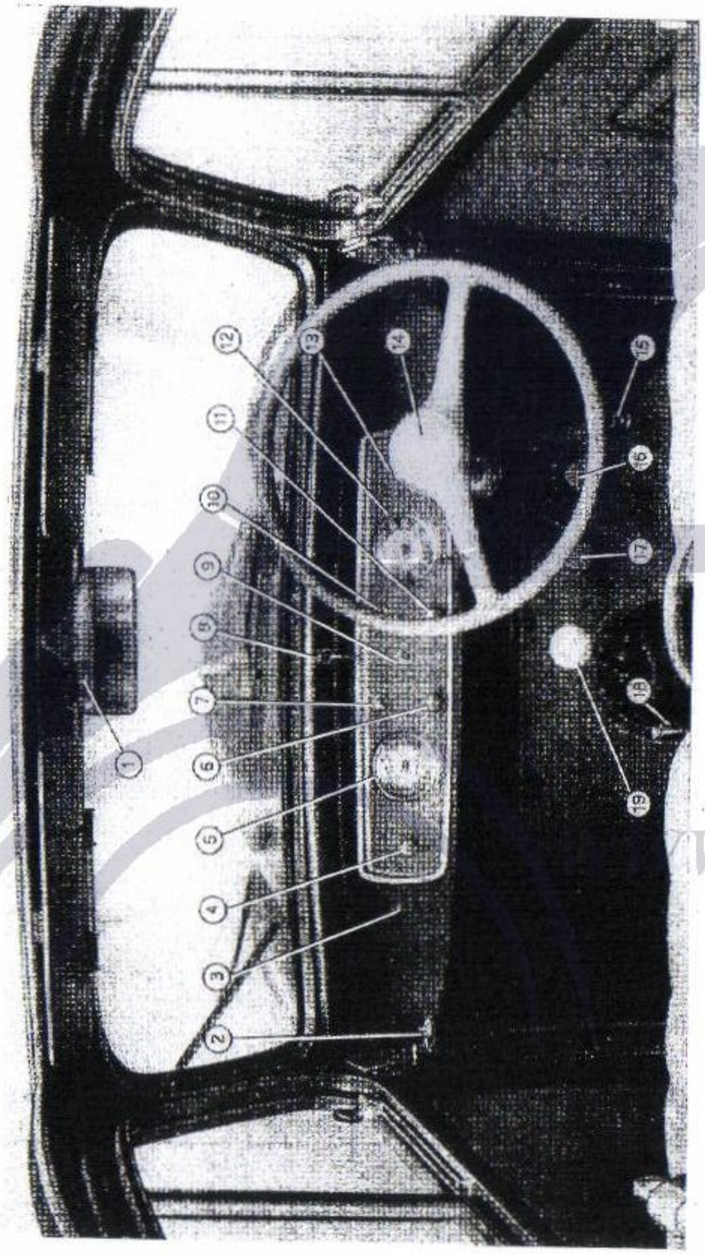


Fig. 13 bis. - Instruments and controls, for right-hand-drive cars.

1. Inner lighting switch. - 2. Lever for the bonnet catch. - 3. Tell-tale light for parking lights. - 4. Accelerator knob. - 5. Fuel gauge and oil pressure gauge. - 6. Starter knob. - 7. Lever switch for instruments light. - 8. Direction indicators commuting switch. - 9. Lock-and-key switch for outer lighting and ignition, with warning light for dynamo charge voltage. - 10. Screenwiper switch. - 11. Knob for carburetor easy start device. - 12. Speedometer and trip recorder. - 13. Turning knob for heating control, - 14. Horn push button, - 15. Accelerator pedal. - 16. Brake pedal. - 17. Clutch pedal. - 18. Transmission brake lever, - 19. Gear lever.

— Control knob for starting motor.

— Lock-and-key switch for outer lighting and ignition, with warning light of insufficient voltage for dynamo charge.

— Screenwiper switch.

— Control knob for the easy start device of carburetor.

— Speedometer.

— Turning knob for control of the heating installation.

— The check light for the parking lights.

On the upper edge of the instrument panel there is the commuting switch for the direction indicators.

The key of the lock-and-key switch can be inserted down to the first stop to control the external lights, but to achieve also the ignition control it must be pushed right down.

Irrespectively of either position in which the key has been set the following combinations can be obtained:

O = all lights off,

I = parking lights, width lights and tail lights on,

II = anti-dazzle lights, width lights and tail lights on,

III = headlamps, width lights and tail light on.

The ignition circuit, however, may be closed only if the key is pushed right down. The key may eventually be withdrawn from whatever position it is set.

ON THE STEERING WHEEL

In the center of the steering wheel is mounted the horn button.

ON THE FOOTBOARD

The clutch, hydraulic brake and accelerator pedals.

IN CENTRE OF FLOOR

The gear lever and the transmission hand brake lever.

BODYWORK DETAILS

BONNET

The hood is closed by a hinged bonnet that can be tilted open. To open it, the knob should be pulled which is on the instrument board, on the same side as the steering wheel. By doing thus the bonnet can be lifted enough to permit the inner safety hook being set free. Whereupon the bonnet can be fully opened and fixed in this position by a suitable catch.

Access to the engine may be rendered further easier by removing the front grill after unscrewing the two upper nuts that fix it to the body work, and taking the grille off vertically.

HEATER FOR THE INTERIOR OF THE CAR

A warm air scoop is arranged within the hood at the back of the radiator, and an adjustment is provided through a deflector controlled by a turning knob on the instrument panel.

REAR PORTION OF FLOOR

At the back of the driver's seat a suitable sheet plate box, formed into the floor, houses the battery which can be easily reached by unscrewing the knob that fixes the cover of the box.

SIZE

Maximum size of car, without bumpers	length	10′ 7 ¾″	(m 3,245)
	width	4′ 2 ¾″	(m 1,288)
	height	4′ 6 $^{9}/_{64}$″	(m 1,375)

WEIGTH

Weight of the car in running order with a spare wheel and tools . . . . . about 12 cwt (610 kg)

Useful load . . . . . Two persons + 1 cwt (+50 kg)

TYRE PRESSURE

Front and rear tyres . . . . . 21 lbs p. sq. in (1,5 kg/cm²)

CAPABILITIES

SPEED

Maximum permissible speeds for cars having a rear axle ratio of 8 to 39:

Bottom	speed	about	12	miles	per	hour	(20	km/h)
2nd	»	»	21	»	»	»	(34	»)
3rd	»	»	34	»	»	»	(55	»)
Top	»	»	59	»	»	»	(95	»)

GRADIENTS

climbable for cars with Fiat body:

Bottom gear	about	1 in 4 $^{1}/_{2}$	(22%)
2nd »	»	1 in 7 $^{2}/_{3}$	(13%)
3rd »	»	1 in 14	(7%)
Top »	»	1 in 33	(3%)

CONSUMPTION

56 ½ miles to the Imp. Gall., that is;
47 miles to the U.S. Gall. (5 lt per 100 km).
Autonomy: about 276 miles (450 km).

REPLENISHMENTS

Part to be refilled	Quantity		Substance
	About:		
Fuel tank	4 $^{3}/_{4}$ Imp. Gall.	21,5 lt	Gasoline
Radiator and cylinder jackets	1 Imp. Gall.	4,5 lt	Water *
Engine sump	4 $^{1}/_{3}$ lbs	2 kg	Fiat Oil **
Gearbox	1 $^{2}/_{3}$ lbs	0,75 kg	Fiat CP Oil
Rear axle casing . . .	1 $^{1}/_{3}$ lbs	0,60 kg	Fiat CP Oil
Steering box	3 oz	0,08 kg	Fiat CP Oil ***
Hydraulic brake system . .	1 $^{2}/_{9}$ lbs	0,55 kg	Lockheed Fluid
Hydraulic shock absorbers .	—	—	Fiat S.A.I. Oil
Oil gun nipples	—	—	Fiat E Oil

* When the temperature drops below 40° F (5° C) it is advisable to use an antifreeze mixture (See page 57).

** When the temperature is above 50° F (10° C) use Fiat V E oil; for temperatures below 50° F, Fiat V I oil (See on page 46).

*** Fiat C P Oil should be used to refill the steering box when reassembling. For occasional addition of lubricant inject Fiat E Oil.

CHARACTERISTICS OF FIAT LUBRICANTS

LUBRICANT	DATA		
Fiat VE Oil for engine (≃ SAE 50)	Flash point (in open cup)		≧ 210° C
	Pour point		≧ −16° C
	Max. viscosity at 50° C	Engler units	17,1
		Kinematic Cst	130
	Viscosity at 100° C	Engler units	2,4 to 2,6
		Kinematic Cst	15,7 to 17,6
Fiat VI Oil for engine (≃ SAE 20)	Flash point (in open cup)		≧ 200° C
	Pour point		≧ −20° C
	Max. viscosity at 50° C	Engler units	5,8
		Kinematic Cst	44
	Viscosity at 100° C	Engler units	1,64 to 1,74
		Kinematic Cst	7,9 to 9
Fiat CP Oil for gear box and rear axle (≃ SAE 90)	Flash point (in open cup)		≧ 210° C
	Pour point		≧ − 0° C
	Max. viscosity at 50° C	Engler units	23,7
		Kinematic Cst	180
	Viscosity at 100° C	Engler units	2,64 to 2,87
		Kinematic Cst	18 to 20
Fiat F Oil (≃ SAE 10)	Flash point (in open cup)		≧ 180° C
	Pour point		≧ −15° C
	Max. viscosity at 20° C	Engler units	20
		Kinematic Cst	152
	Viscosity at 50° C	Engler units	3,1 to 3,8
		Kinematic Cst	22 to 27,8
Fiat E Oil	Flash point (in open cup)		≧ 240° C
	Drop point (Ubbelhode)		40° to 50° C
	Viscosity at 75° C	Engler units	4,3 to 5,8
		Kinematic Cst	32 to 38
Fiat A 11 Grease	Appearance		fibrous
	Drop point (Ubbelhode)		150° to 160° C
	Consistence		240 to 290
Fiat A 3 Grease	Drop point (Ubbelhode)		140° to 160° C
	Consistence		180 to 220
Fiat GCS 15 Grease	Drop point (Ubbelhode)		140° to 160° C
	Consistence		180 to 200
Fiat GCS 22 Grease	Appearance		fibrous (red)
	Drop point (Ubbelhode)		160° to 180° C
	Consistence		220 to 250

DRIVING THE CAR

REPLENISHMENTS AND INSPECTIONS

The car is delivered by our Agents in running order; the radiator, the engine, the gear box and the rear axle being filled up to the correct level. Before starting the engine, however, it is advisable to make sure that the radiator is properly filled up, that the oil level in the engine sump reaches the upper mark on the dipper rod, and that there is gasoline in the tank.

To reach the tank filler plug, the radiator cap and the oil filler plug, open the bonnet (fig. 14), after pulling the knob on the instrument panel, on the same side as the steering wheel.

On starting the car after a long period it has been laid by it is advisable:

— To carry out a general lubrication of the chassis.

— To inspect the brakes, the steering mechanism, the tyres and the efficiency of the battery charge.

— Employing the suitable handle, crank for a few turns the engine so as to render easier the electric starting which might be hindered by the pistons being gummed by sluggish oil. By a preliminary cranking of the engine it is also obtained the filling up of the carburetor bowl.

— Remove the spark plugs and have the points accurately cleaned by means of a wire brush dipped into gasoline.

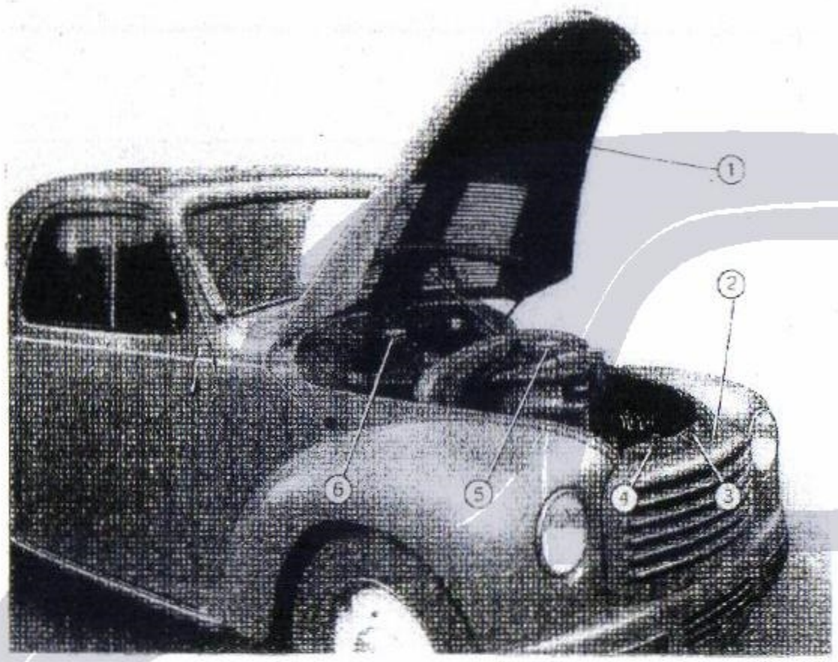


Fig. 14. - Accessibility of engine and filler caps.

1. Bonnet. - 2. Grill. It can be removed by unscrewing the two nuts that fix its upper corners. - 3. Catch for the bonnet. - 4. Safety hook for the bonnet. - 5. Radiator filler cap. - 6. Gasoline tank filler cap.

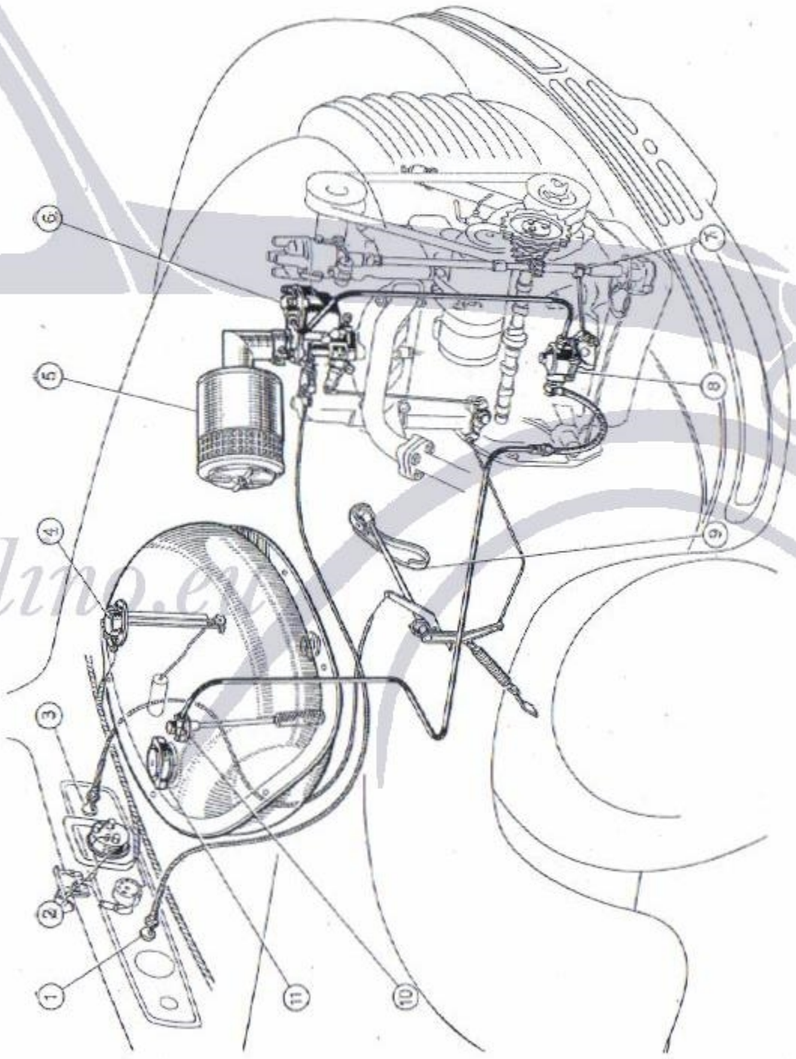
STARTING THE ENGINE

BEFORE STARTING THE ENGINE

After effecting or checking the replenishments make sure that the gear lever is in neutral. In this position the lever is free to move sideways. Then pull right out the carburetor primer knob (rich mixture) leaving in rest position the accelerator control knob. The engine is ready to start.

Fig. 16.
Diagram of fuel system and carburetor controls.

1. Carburetor primer control knob. - 2. Gasoline level gauge and reserve warning light. - 3. Throttle control knob. - 4. Electric fuel level device. - 5. Air cleaner and silencer. - 6. Carburetor. - 7. Cam on oil pump shaft for driving the feed pump. - 8. Feed pump. - 9. Accelerator pedal. - 10. Gasoline intake connection, with filter. - 11. Filler cap of gasoline tank.



STARTING THE ENGINE

Insert the key right down in the ignition switch and turn it so as to switch the ignition on, that is, so as to allow the passage of the current from the battery to the ignition distributor (Fig. 16).

The red light, which shows that the dynamo has not yet a voltage sufficient to charge the battery, will then light up within the switch.

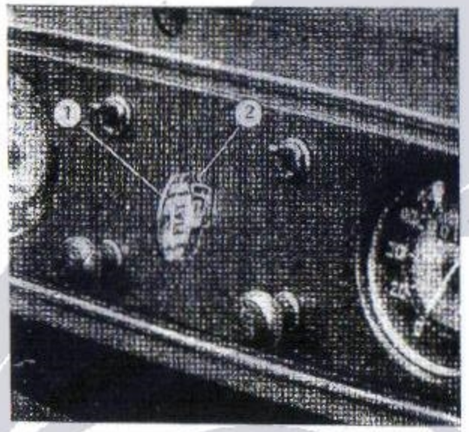


Fig. 16.
Lighting and ignition switch.

1. Position of the key for only outer lighting.
2. Position of the key (inserted right down) for outer lighting and ignition.

Pull right out the control knob of the starting motor and leave it in this position until the engine is well under way, i. e. without misfiring.

Should the outer temperature be below 23°F (—5°C) have care to pull again in rest position the carburetor primer knob (rich mixture) not later than 20 seconds after starting the starter motor in order to prevent a too rich mixture and an ensuing difficult starting.

In cold weather the starter motor will turn more easily if the clutch pedal is depressed. In winter it is also advisable to turn the engine first by hand.

Fig. 17. - Position of controls when starting the engine from cold.

1. Self starter knob (pulled right out). - 2. Key of the lighting and ignition switch (pushed right down). - 3. Carburetor starter knob (pulled right out). - 4. Hand breke lever (pushed hard on). - 5. Gear lever (in neutral).

AFTER STARTING THE ENGINE

If the engine has been started from cold, let it idle for about two minutes in summer, and a little longer in winter, until the oil is sufficiently warmed up to circulate freely throughout the system. The engine speed must at first be moderate because the oil cannot at once reach and properly lubricate all the necessary parts.

Should the engine tend to stop after being started, press the accelerator a little further down and keep the engine at a slightly higher speed, pulling out the knob which also acts on the accelerator.

In any case, avoid running the engine at any great speed until it is thoroughly warmed up.

When the engine is warm and running at average speed the standard oil pressure should be about 35 lbs. per sq. in. (kg 2,5 per cm^2). This pressure anyway may get as low as 7 lbs. per sq. in. ($\frac{1}{2}$ kg/cm^2) if the engine turns slowly or can grow up to 70 lbs. per sq. in. (5 kg per cm^2) if the oil is very sluggish owing to the cold.

STARTING FROM WARM

In hot weather the gasoline vaporises more readily so that when the engine is warm, or in summer, the customary proceeding with the control knob may result not convenient on account of a mixture too rich and difficult to ignite. In such a case it is advisable to weaken the mixture by pulling out also the knob of the throttle control for about one quarter of its stroke.

If the engine is very warm, as it happens when it has been stopped a few moments ago, it may be sufficient to operate only the knob controlling the starter.

Unnecessary use of the carburetor primer knob causes too much gasoline to flow into the cylinders, washing away the lubricating oil and causing premature wear of the walls.

DIFFICULT STARTING FROM WARM

On stopping the engine after a long and steep climb, the temperature rises during a few minutes inside the hood, owing to the fan which has stopped too.

In consequence of this state of affairs it can happen that gas bubbles are being formed within the fuel pump and that subsequently it will be difficult to start the engine again.

To avoid this inconvenience, any time the starting must occur after just a few minutes the engine has been stopped, it is advisable to maintain the engine idling so that there will go on the cooling effect of the fan.

It is obvious that there is no need to act thus when the stop will be long.

DIFFICULT STARTING

Should the engine fail to start do not persist with the electric starter, but check over all the ignition equipment and the feed system and crank the engine over by hand to see if it is free.

Starting should be easy even in the coldest weather as long as the operation conditions of the engine are normal and it be rotated at a sufficiently high speed.

The speed may be inadequate, however, on account of:

a) The battery being almost run down.

b) The oil being too thick.

The engine may not start also, on account of:

c) The air leaking into the inlet manifold, or through the valve guides (this last case is possible only after several years of use).

In the first instance, tighten the nuts or replace the gaskets; in the second one, send the car to a Service Station to be repaired.

d) Inadequate compression (piston rings broken or sticking, over-oxidized valves, valve tappets not properly adjusted).

In this instance the engine should be regulated or overhauled by a Service Station in order to eliminate the above mentioned troubles.

e) Poor quality gasoline. Change it.

GETTING THE CAR UNDER WAY

In order to get the car under way, depress the clutch pedal and bring the gear lever in the first speed position by pushing it to the left and then tilting it forward.

Release afterwards the brake hand lever.

Release gradually the clutch pedal until the car begins to move.

Release pressure on the clutch pedal and increase simultaneously the engine speed, by pressure on the accelerator pedal, till the speed of the car is of about 5 to 6 m. p. h. (8 to 10 km) which is sufficient to allow the gears being shifted to the second speed position.

When the car is started on a gradient, all the above mentioned operations must be performed simultaneously — which will be easily done after a little practice.

GEAR CHANGING

To get into second gear the accelerator pedal must be released, the clutch pedal pushed well down and the gear lever shifted so as to pass first into neutral, holding it there for an instant, and then pulling it backwards.

The same operations must be carried out to get into third gear when the car has attained a speed of about 12 miles (18 to 20 km) per hour, except that the gear lever, from neutral, must be moved according to fig. 19.

Changing up from third to fourth, or down from fourth to third, is made considerably easier and more silent by the effect of the synchromesh gears.

When changing down from any gear to a lower one it is advisable, having declutched, to accelerate the engine somewhat so that its speed does not offer a momentary resistance to the motion of the car when the clutch is again engaged.

To make a quiet change from 3rd to 2nd or from 2nd to lst, it is necessary to double declutch, that is:

1) declutch;
2) engage the clutch and accelerate the engine;

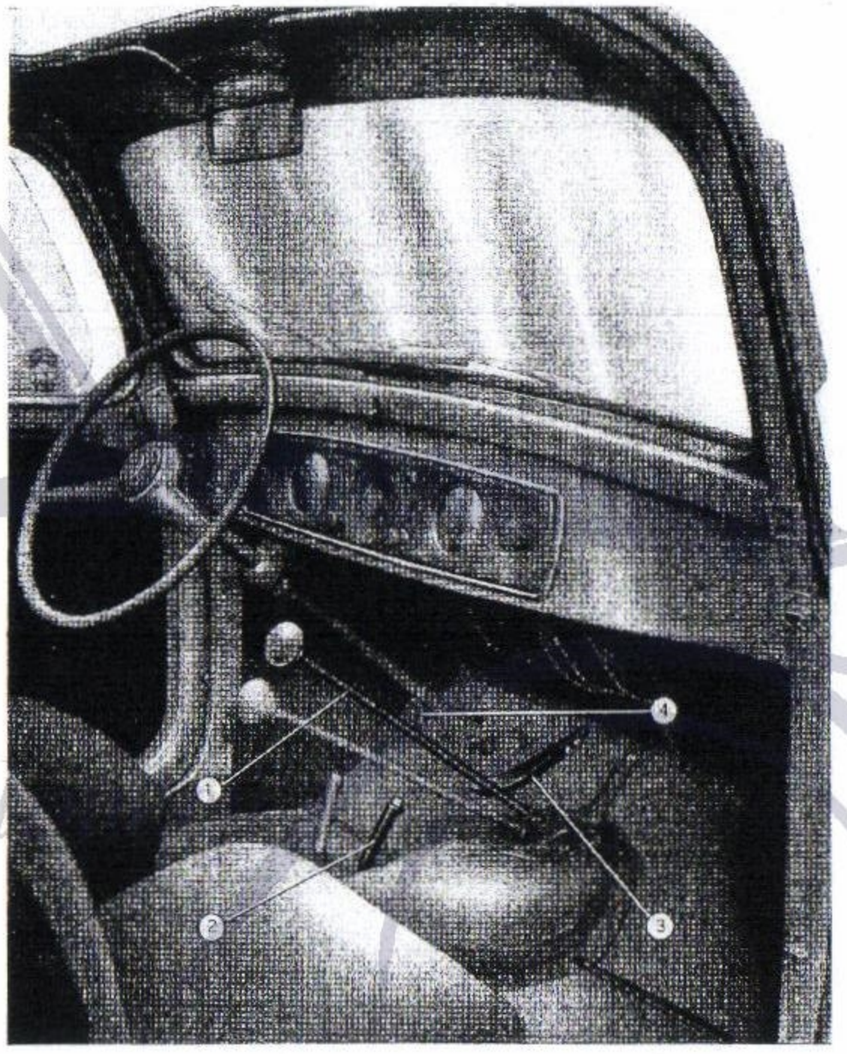


Fig. 18. - Setting of the controls when starting the car.

1. Gear lever (in first-speed position). - 2. Hand brake lever, in «off» position. - 3. Accelerator pedal (to be pressed lightly). - 4. Clutch pedal (pushed right down).

3) declutch again and quickly engage the new speed;
4) re-engage the clutch.

By carrying out the above instructions the periphereal speed of the gears is practically equal and a silent change results.

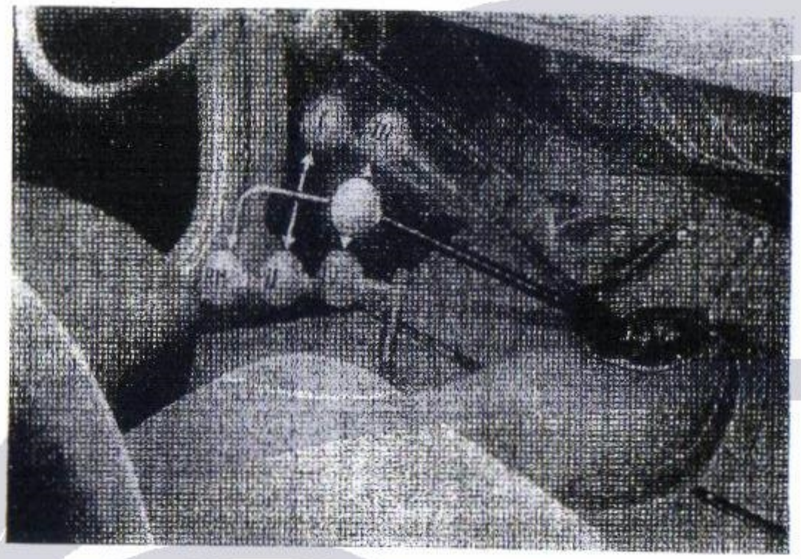


Fig. 19. - Positions of gear lever.

I. First speed. - II. Second speed. - III. Third speed. - IV. Fourth speed or direct drive. - RM. Reverse.

In order to reverse, declutch, move the gear lever into neutral, shift it decidedly sideways and then pull it backwards.

When reversing either way, the car must always be brought first to a dead stop.

ON THE ROAD

— On the level practically all speeds, from 9 m. p. h. (15 km) to the maximum of which the car is capable, can be obtained by simply operating the accelerator pedal, the carburetor and spark advance controls being automatic.

— On steep gradients it will be necessary to change down from third to second gear when the speed of the car drops below 15 miles per hour (25 km), and should the speed drop below 9 m. p. h. (15 km) engage the bottom gear.

— When coming down-hill, release fully the accelerator pedal, so as to have the engine running at minimum speed, without disengaging the clutch nor switching off the ignition. The engine will then act as a brake and it will be sufficient to apply the foot brake only at intervals, thus avoiding overheating the brake drums.

— If the hill is very steep, a lower gear should be engaged in order to obtain a higher braking effect.

— If the electrical equipment is in order and the headlights are switched off, the switchbox warning light goes out when the car is running at 13 m. p. h. (20 km) in top gear. The dynamo then is starting to charge the battery.

— The oil pressure gauge should always read 35 lbs (2,5 kg/cm²) at normal operation speed.

— Mind when there ligths up the fuel level warning lamp. Tris means that only 1 1/3 USA Gallon, viz., about 1 1/8 Imp. Gall. (5 litres) of gasoline have remained in the tank and that a replenishment is needed before this reserve is exhausted.

— When driving, avoid keeping the foot on the clutch pedal, if not necessary, otherwise the clutch slips, the thrust bearing gets overheated and becomes noisy.

— When driving on snowy roads, the rear wheels must be equipped with suitable chains so as to avoid the car skidding dangerously.

— Avoid applying the brakes when the car is sideslipping. Correct instead the sideslip by turning the front wheels in the direction towards which the back of the car is skidding.

— On slippery and wet roads, avoid applying the brakes abruptly. Slow down before turning a corner.

— In order to prevent the windscreen getting covered with hoarfrost, turn the knob of the heating installation on the instrument board as shown by the arrow. A current of warm air is thus directed against the windscreen (Fig. 20).

— When driving the car, avoid depressing constantly the accelerator pedal. The time employed does not depend always upon the maximum speed.

— Always keep the car to the correct side of the road, especially when turning corners.

— Do not rely on the electric horn. Instead of actuating the horn, pay the utmost attention so as to avoid collisions or serious accidents, especially in places where the visibility is poor.

TO STOP THE CAR

When it is desired to stop the car, the foot brake should be employed. Just before the car is stopped, the clutch should be disengaged and the gear lever shifted to neutral, the engine running slowly.

It is not advisable to stop also the engine, if the car is stopped only for a short time, so as to avoid employing too often the electric starter and getting the battery run down.

When the car has stopped, and only then, apply the hand brake.

The same should be done when the car is parked and especially when it is stationary on a gradient, in which case even the bottom speed or the reverse may be engaged.

STOPPING THE ENGINE

To stop the engine it is sufficient to remove the key of the lock-and-key switch, or to lift it up to the upper position. The

ignition current is thus cut off and the warning light in the switch handle goes out.

The external lighting switch does not however depend upon the ignition circuit.

If the key is inadvertently left in the ignition position when the engine is stopped, the battery becomes discharged and the coil may get burnt out in a few hours.

NIGHT TRAVELS

During the night travels the car speed depends upon the reach of the headlight beams that must, therefore, be checked for direction and perfect efficiency. If another car comes, slow down and keep the more closely possible to the correct side of the road while commuting the head lights into anti-dazzle lights. The antidazzle ligths should be resorted to not only when meeting a car coming in the opposite direction but also when a car is preceding shortly ahead.

Turn to the antidazzle lights also when the visibility is poor owing to fog, because the minute droplets of the fog behave as tiny convex mirrors which reflect the light in the shape of a dazzling curtain.

WINTER PRECAUTIONS

In winter, if the car has to be laid up with a temperature near or below 32° F (0° C), the radiator and cylinder block must be emptied of water through the drain cock situated in front of the cylinder block.

If it is desired to avoid both the damage due to freezing and the trouble of emptying the radiator, recourse may be had to the use of an antifreeze mixture instead of water. The antifreeze mixture may be obtained from our Service Stations; its composition being given on page 57.

During the winter months it is also advisable, according to the severity of the cold, to obstruct more or less the front grill by means of the suitable, inner curtain.

HAVING RECOURSE TO THE HEATER

To heat the car interior in the cold season, simply turn the control knob on the instrument board in the direction shown by the arrow (Fig. 20). Two levers, provided on the two side pipes for warm air delivery, allow of distributing the air either towards the windshield or toward the foot board, also in both directions.

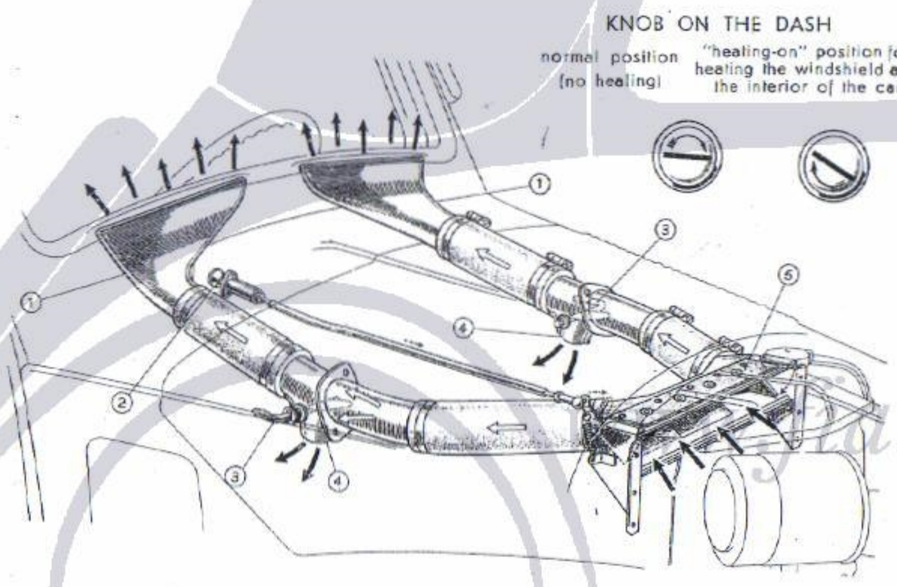


Fig. 20 - Heating installation for the interior of the car.

1. Hot air diffusers on the windshield. - 2. Knob on the dash for controlling the deflector that conveys the air heated through the radiator. - 3. Levers for control of the throttles that distribute the hot air (According to their position hot air is sent to the windshield, to the interior of the car or to both places). - 4. Hot air outlet to the interior of the car. - 5. Deflector set in position for admitting hot air in the pipes.

GENERAL MAINTENANCE

The importance of taking the necessary care and making regular inspection of the car cannot be over emphasised.

By reading up and carefully following the instructions given in this booklet much trouble and many costly repairs will be avoided.

CONSULTING THE CHARTS

The maintenance operations, arranged in tabulated notes according to the mileage of the car, are also shown by two charts. The first one covers the items requiring lubrication and the second one the cleaning, inspection and adjustment jobs.

This will enable the owner of the car to consult them more easily and, being fewer the jobs listed in each chart it will be difficult that they be overlooked. Moreover, it will assist owners wishing to look after their cars to attend to them with a correct method.

Each operation is referred to by a number, and the pertaining note is completed with the number of the page where the operation is fully described.

The maintenance operations have been described grouped together, without relation to the mileage, though according to a rational arrangement of the subject matter into groups.

Important. — The mileages mentioned in the charts, may be slightly varied without inconvenience, as the attention required may be different according to the climate (damp or dry), to the road conditions (steep, dusty, muddy), etc.

Some items, like the tyres, require attention only periodically, some others instead, like the batteries, require attention not only periodically, but also when they are overcharged (long drives during the day in summer time) or in hot weather.

The brakes require closer attention when the car is driven through mountainous countries than when it is running on level roads. The clutch requires closer attention when cars are driven chiefly in town traffic, etc.

Moreover, it should not be forgotten that the chassis general lubrication, and particularly of the engine and steering gear, must be attended to oftener during the running-in period than later on, when the mileages mentioned in the tabulated notes are quite sufficient.

NOTE. — The nipples should be carefully cleaned before the gun is connected to them, so as to prevent the dirt or mud being introduced with the lubricant in the items being greased.
After the nipples have been refilled, wipe them accurately so as to remove all traces of oil, which may help the dust being accumulated again on them.

ENGINE

LUBRICATION

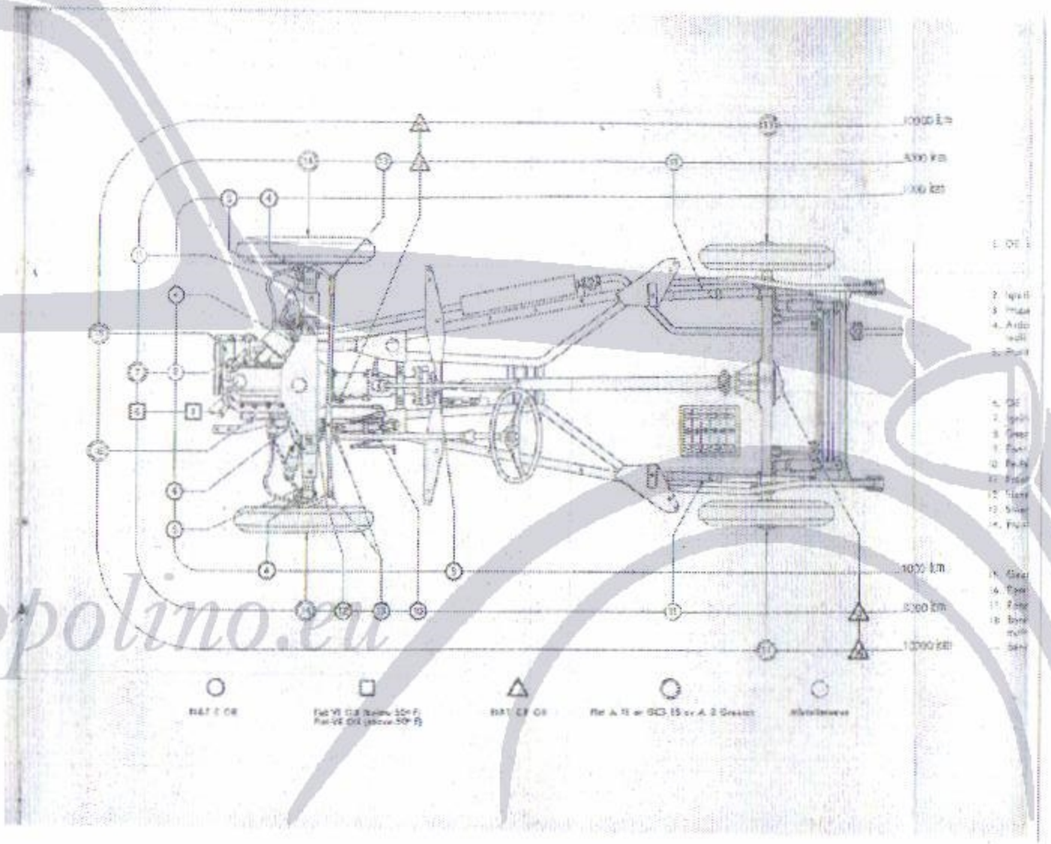
SUMP

Every 180 miles (300 km): Check the oil level with the dip stick to the left of the block cylinder and, if necessary, fill up to the « Max » notch by pouring the oil into the oil filler plug on the cylinder head cover.

Every 1800 miles (3000 km): Replace the sump oil.

When the engine is running, the oil accumulates impurities and, at the same time, loses its lubricating properties on account of the petrol finding its way to the oil sump by leaking between the pistons and the cylinder walls, specially when the engine is cold. It is recommended, therefore, that the oil be periodically replaced.

When the car is used in town traffic, especially in cold weather, that is, with frequent starts from cold, or nearly cold, the oil level may appear not to have dropped, even after the car has been driven for 120 of 180 miles (200 or 300 km). This happens because the oil consumed by the engine is replaced by the gasoline diluted in the sump. This oil has lost all lubricating proper-



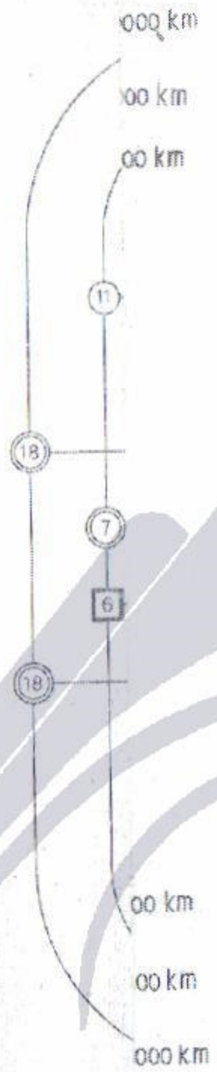


Fig. 21.

General lubrication diagram for the chassis.

Every 180 miles (300 km)

1. Oil sump . . . . . see page 46

Every 600 miles (1000 km)

2. Ignition distributor . . . . . » 59
3. Propeller shaft . . . . . » 65
4. Articulation of spring and swinging radii of front suspension . . . » 70
5. Front wheel steering knuckles . . » 73

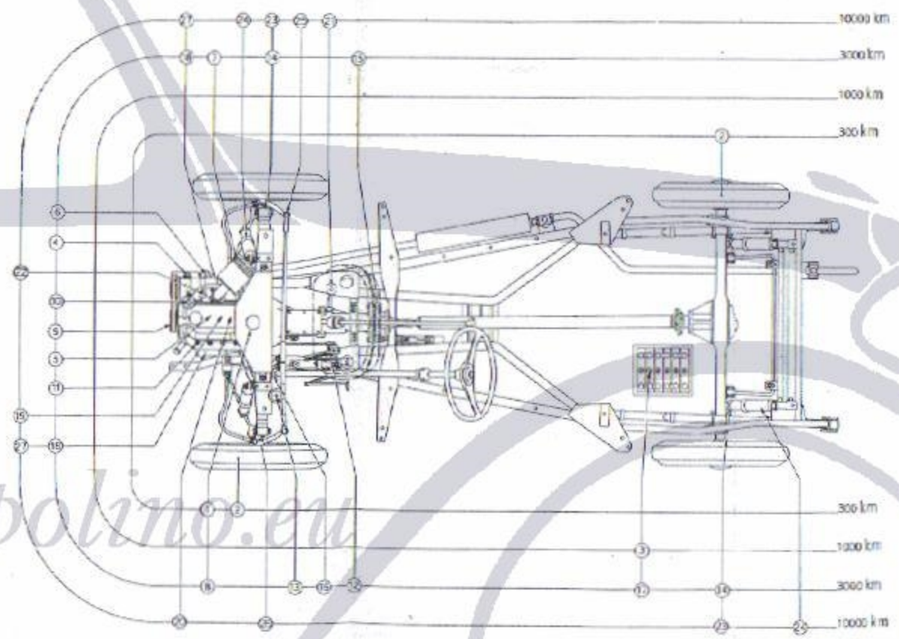
Every 1800 miles (3000 km)

6. Oil sump . . . . . » 46
7. Ignition distributor . . . . . » 59
8. Gear box . . . . . » 65
9. Rear axle . . . . . » 65
10. Pedal shaft . . . . . » 65
11. Front and rear road springs . . . » 70
12. Steering box . . . . . » 71
13. Steering rods . . . . . » 72
14. Front wheel bearings . . . . . » 74

Every 6000 miles (10000 km)

15. Gear box . . . . . » 65
16. Rear axle . . . . . » 65
17. Rear wheel bearings . . . . . » 74
18. Bearings of dynamo and starter motor . . . . . » 77

— Bearings of fan spindle . . . . » 59



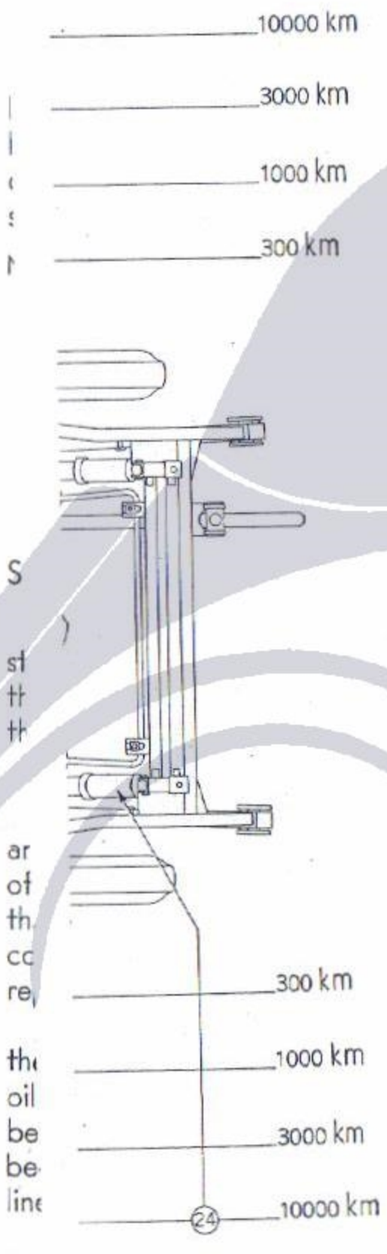


Fig. 22.
Cleaning, inspection and adjustment diagram.

Every 180 miles (300 km)

Every 600 miles (1000 km)

Every 1800 miles (3000 km)

Every 6000 miles (10000 km)

ties and must be replaced so as to avoid bearings and cylinder walls being scored.

Under the above conditions, it will be necessary to replace the oil offener, for instance every 1000 to 1300 miles instead of every 1800 miles (every 1500 to 2000 km instead of 3000 km).

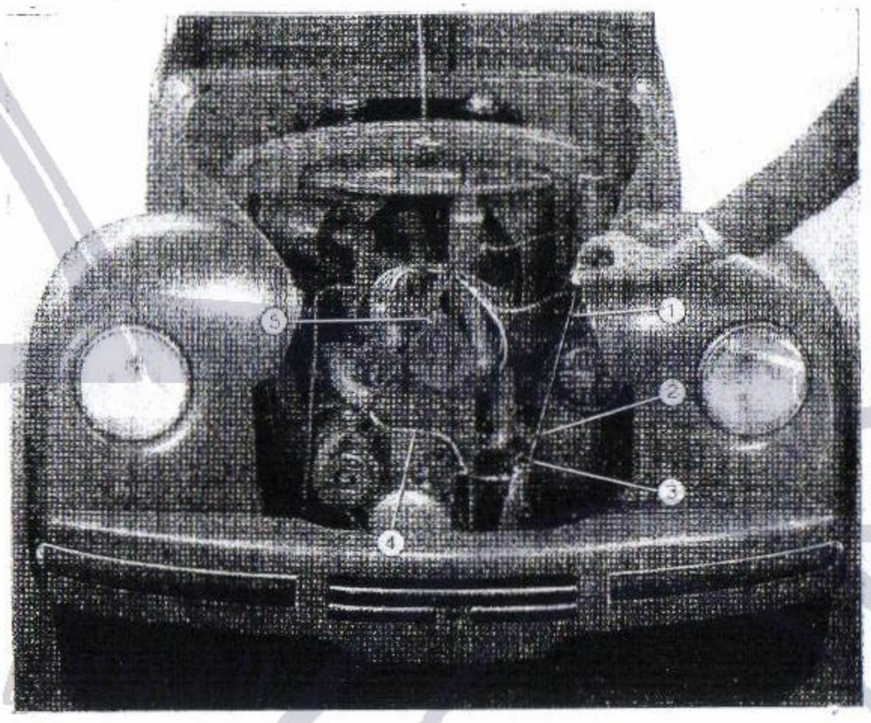


Fig. 23. - Oil dip stick for the sump.
1. Oil dip stick. - 2. Maximum oil level. - 3. Minimum oil level. - 4. Pipe for forced air circulation within the engine. - 5. Oil filler plug.

When the sump is not taken down it should be drained while the engine is warm, by unscrewing the drain plug on the bottom of it, making sure that the used oil is drained completely away.

An excellent practice is to pour into the sump, after having emptied it, about two pints of a flushing oil (Fiat L). This is then made to circulate by running the engine slowly for two or three minutes, after which it is emptied out. If suitably filtered,

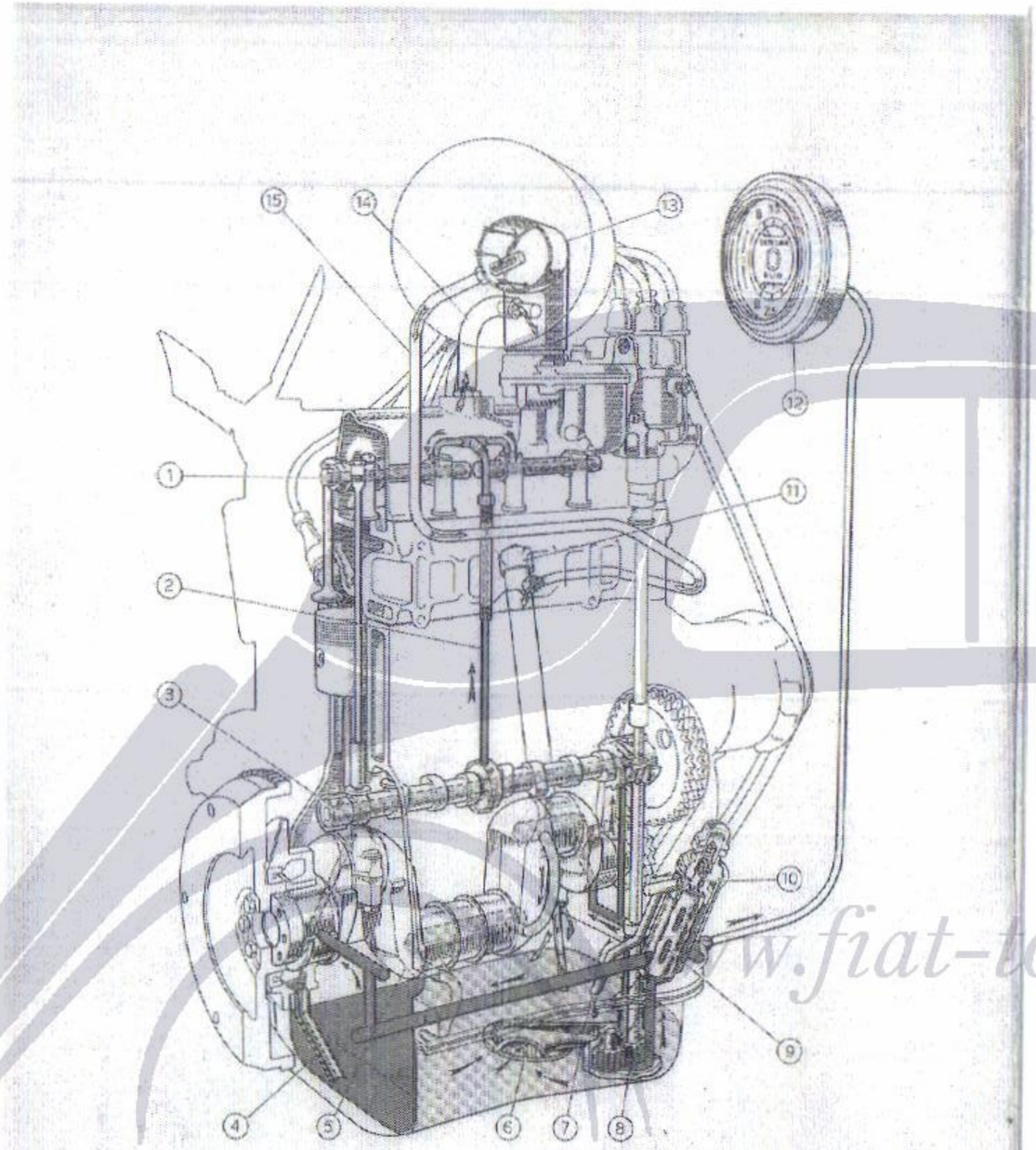


Fig. 24. - Diagram of oil and forced air circulation inwardly the engine.

1. Rocker shafts for valves control. - 2. Oil delivery pipe to rocker shafts. - 3. Camshaft. - 4. Oil discharge pipe from rear main bearing. - 5. Crankshaft. - 6. Intake filter for oil pump. - 7. By-pass pipe from oil pressure valve. - 8. Gear oil pump. - 9. Delivery strainer. - 10. Pressure relief valve. - 11. Dip stick. - 12. Oil gauge and fuel level indicator. - 13. Connection between air cleaner and carburator. - 14. Vent pipe. - 15. Pipe for forced circulation of air within the engine.

this flushing oil can be used a second time and is far preferable to paraffin, the residues of which may dilute the fresh oil when the sump is refilled.

If it is desired to attain a more thorough cleansing of the sump it must be taken down. In this case the opportunity may be taken to clean the suction filter mounted on the oil pump.

The quality of the oil used in the engine should vary according to the external temperature.

	Temperature	
	Above 50° F (10° C)	Below 50° F (10° C)
Grade of oil	Fiat VE Oil	Fiat VI Oil

For the better conservation of the engine we recommend—especially during running in—to mix with the petrol some Fiat CM oil, suitable for upper cylinder lubrication.

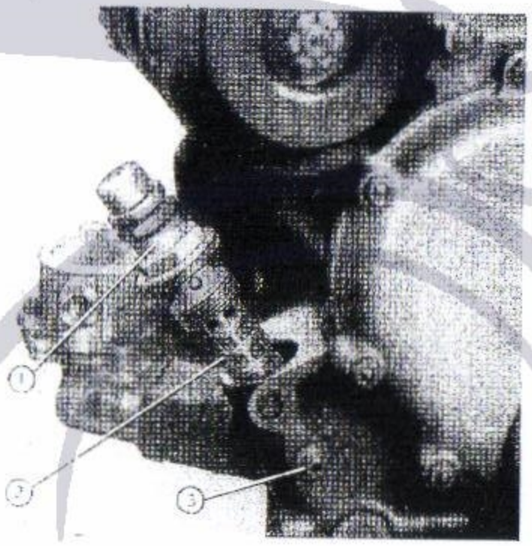


Fig. 25.
Oil delivery filter, removed.

1. Body of pressure relief valve.
2. Gauze.
3. Connection to oil gauge.

OIL DELIVERY FILTER

Every 1800 miles (3000 km): Unscrew the filter holder on the offside of crankcase and wash both the strainer and the pressure relief valve in kerosene or gasoline.

VALVE TIMING

VALVE TAPPET CLEARANCE

Every 1800 miles (3000 km): Adjust the tappets so that the clearance between valves and rockers is .006" (0,15 mm) both for intake and exhaust valves.

The adjustment is effected by means of the adjusting screw with lock nut, provided on every rocker (Fig. 26). Measurements

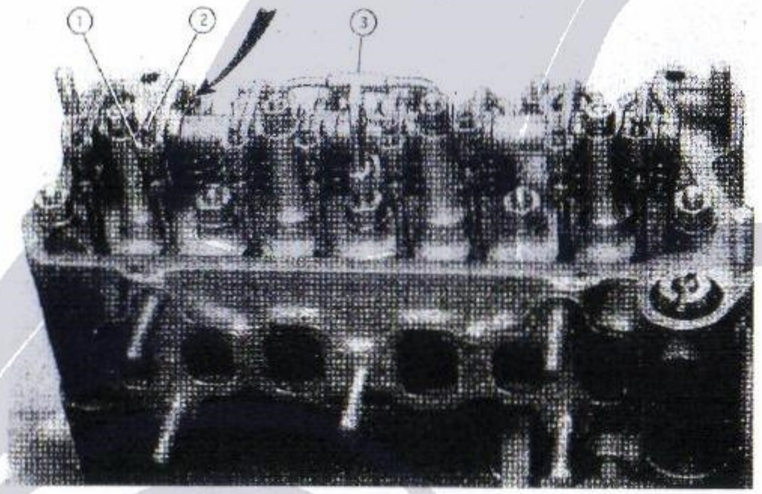


Fig. 26. - Adjusting the clearance between valves and rockers.
1. Lock nut for the adjusting screw. - 2. Adjusting screw. - 3. Oil delivery pipe for rocker supports.
The arrow points to the clearance between valve and rocker.

must be made, when the engine is cold, by means of a feeler gauge of the correct thickness.

Remember that if the clearance is greater than the figures given above, the valve gear will be noisy; on the contrary, with too small a clearance there is danger that the valve will not close properly, giving rise to various troubles, such as backfiring and overheating, which cause the valve to wear out rapidly. Any variation from the normal clearance also causes a variation in the valve timing.

COMPRESSION CHAMBERS AND VALVE SEATS

Every 6000 miles (10.000 km): Take off the cover and the cylinder head and remove the carbon layer that has formed in the compression chamber and on the cylinder head.

This operation must be effected too whenever the engine begins to knock through autoignition, which is a sign of carbon deposits.

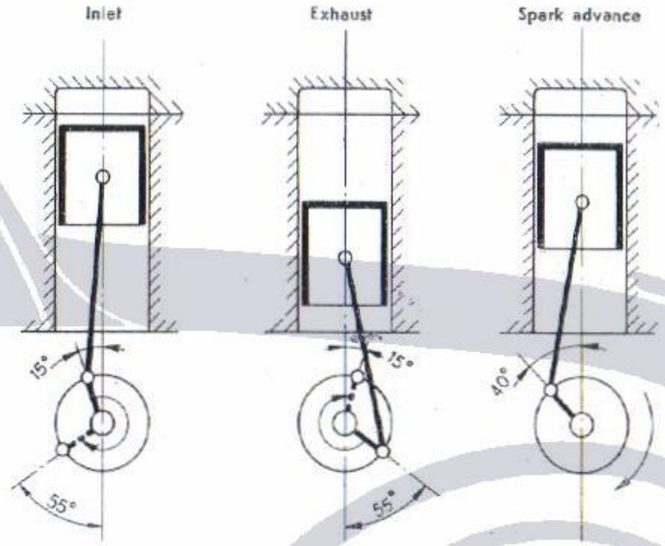


Fig. 27. - Valve timing diagram.
(Above data bear reference to a clearance of .0067" (0,17 mm) between valve stem and rocker arm of both valves, necessary for timing).

The chambers can be cleaned out either with a copper or brass scraper or with a stiff wire brush.

For taking off the cylinder head, besides unscrewing the fixing nuts, easily seen, there must be removed the two blind nuts within the water outlet ducts in the cylinder head.

When taking off the cylinder head care should be taken not to mark or dent in any way the machined surfaces, and not to damage the gasket, which can be used again.

When reassembling the cylinder head, see that the nuts are tightened up progressively, starting with the centre ones and giving a turn or two alternately to those on opposite sides.

Seizing the occasion of the carbon deposits removal, or whenever a loss of compression is noticed in one or more cylinders, the valve seats should be ground in.

After grinding in, the valve and its seat must be carefully washed with paraffin to remove all trace of emery. Before putting the valve back in position, grease the stem with a mixture of oil and paraffin. Then adjust the tappet clearance as indicated below.

NOTE. — In removing the cylinder head there is taken off also the driving spindle of the ignition distributor so that, after reassembling, the timing of the distributor should be carried out following the proceeding set forth on page 60.

VALVE TIMING

The valve timing data are given in the diagram of Fig. 27. If the camshaft and the pertaining sprocket have been removed or if the driving chain has been taken off, when reassembling, the timing of the camshaft must be effected by proceeding as follows:

— Turn the crankshaft until the tooth marked « O » of the driving gear is pointing to the center of the camshaft seat.

— Slide the camshaft, fitted with its driving sprocket in its seat on the crankcase and turn it so as to make the marks « O » on the sprockets of both shaft coincide (Fig. 28).

— Without altering the position of both sprockets, fit the chain.

No more operations are needed for effecting the timing, since the reference marks have been stamped when the engine was assembled the first time. But if the sprockets have been replaced and the reference marks are missing, the timing and the checking of the pertaining data should be effected by means of a graduated sector. Such an operation must be carried out by a Service Station.

FUEL SYSTEM

FILTER OF FUEL PUMP

Every 1800 miles (3000 km): Take off the cover, remove the filter and wash it diligently in gasoline.

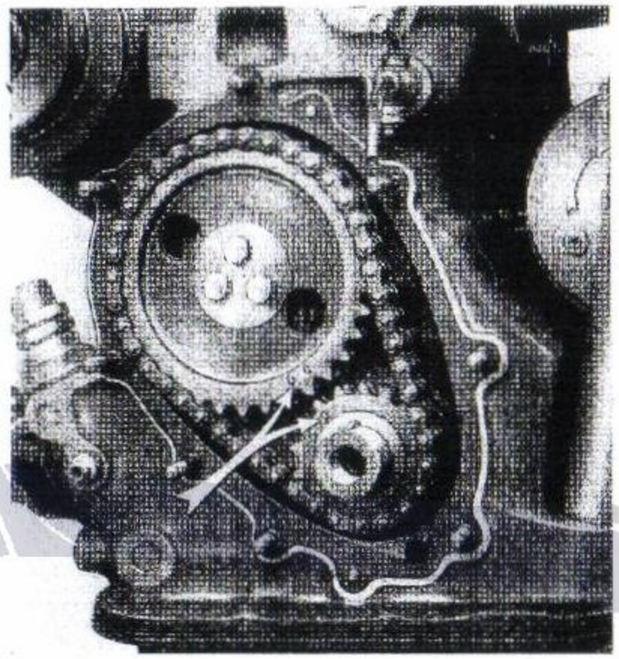


Fig. 28. - Reference marks for valve timing.

(The arrows point to the « Os » which must coincide when the crank and cam shafts are correctly timed with each other).

Clean also the gasoline inlet chamber, unscrewing the drain plug in the lower portion of the connection that carries the fuel to the pump.

Unless assisted by a great practice nothing else should be dismantled; rather apply to a Service Station.

Should it be necessary to remove the pump, slide it off the studs that fix it to the engine crankcase, steer outward the offside wheel, and take off the little door fixed by means of screws on the body work side.

NOTE. — Prior to dismantling the fuel pump for inspection or cleaning, or prior to disconnecting the fuel inlet pipe have care to loosen the connection on the tank so to prevent the gasoline being sucked through the pipe acting as a syphon.

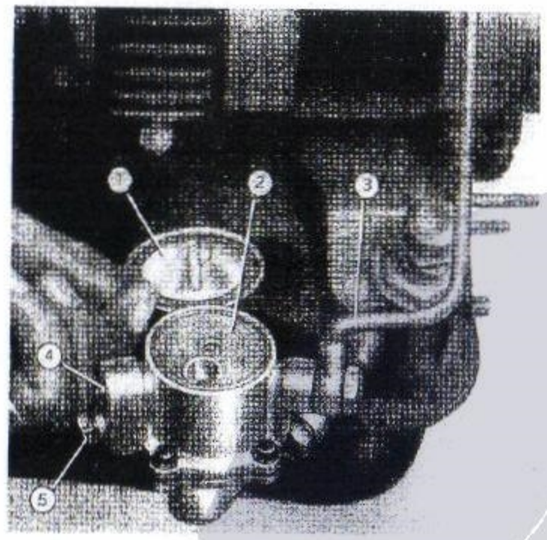


Fig. 29.
Fuel pump.
(the cover is removed).

1. Cover, on the gauze. - 2. Gauze. - 3. Delivery pipe to carburetor. - 4. Gasoline inlet in the pump. - 5. Plug for removal of sediments.

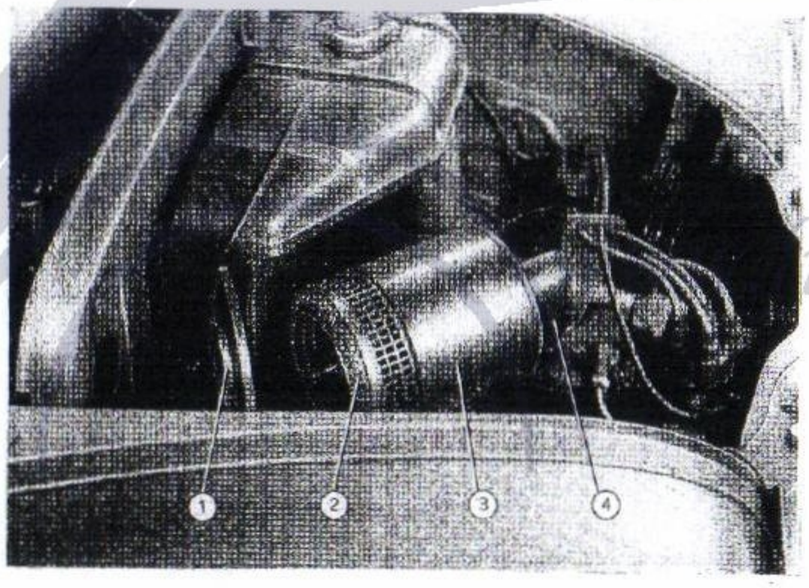


Fig. 30. - Air cleaner (the cover is removed).

1. Cover, taken off. - 2. Filtering bed of steel wool. - 3. Intake silencer. - 4. Union to the carburetor.

AIR CLEANER

Every 1800 miles (3000 km): Dismantle the air cleaner and wash repeatedly the filtering steel wool in kerosene or gasoline so as to remove thoroughly the foreign matter that has been caught. Then allow to drip dry. This cleaning can be effected at longer intervals if the car runs on asphalted roads.

FILTER OF GASOLINE TANK

Every 6000 miles (10.000 km): Take off the filter at the end of the delivery pipe and accurately wash in gasoline or kerosene.

CARBURETOR

Every 6000 miles (10.000 km): Clean inwardly the bowl with a chamois leather and, if necessary, adjust for the idling speed.

In this carburetor the three jets are easily taken off from without and can be slid out from above for cleaning them.

The idling speed can be varied by means of the screw 5 (Fig. 31) which limits the throttle closing.

The screw 4, establishes the richness of the mixture for idling speed, and therefore the idling speed wile be regular only at one particular setting of this screw.

To effect an adjustment for the idling speed, set first the low speed by means of screw 5, leaving screw 4 loosen of about three turns. Then gradually screw up the screw 4 until the engine turns over regularly.

If during ordinary service the engine shows a tendency to stop when the accelerator is released, screw 5 should be screwed up so as to increase somewhat the low speed, establishing also the richness of the mixture by means of screw 4.

The Owner is advised not to dismantle any of the internal parts of the carburetor so as to avoid the risk of damage or incorrect reassembly.

COOLING

RADIATOR

Every 180 miles (300 km): Check the level and, if necessary, add clean water up to correct level.

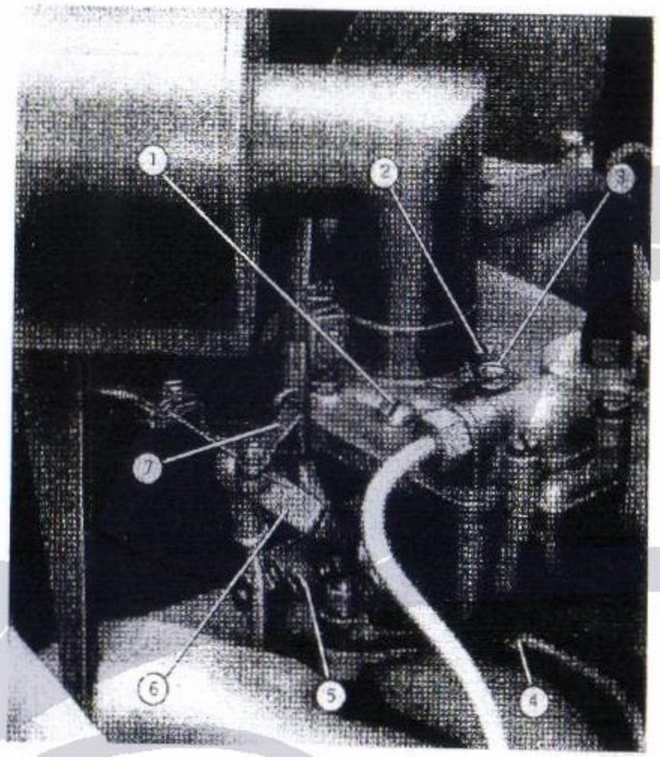


Fig. 31. - Carburetor adjustments.

1. Main jet. - 2. Starting jet. - 3. Idling jet. - 4. Screw for adjusting the mixture richness for idling. - 5. Adjusting screw for throttle. - 6. Throttle control lever. - 7. Control lever for starting device.

Every 1800 miles (3000 km): Drain the water through the cock in front of the cylinder block and carry out a thorough washing of the interior.

If the level of the water is very low and the engine rather warm, avoid pouring in cold water as this may cause cracks in the cylinder block water jacket.

The purest possible water must be used in the cooling system. In districts where the water is slightly alkaline or briny, the addition of nearly 2 ounces (50 gr) of pure bicarbonate of soda will be sufficient to check the formation of scale.

Never make use of other anti-scale or anti-freeze mixtures containing soda, as this will attack the aluminium of the cylinder head.

Wash out the radiator at intervals, especially after having used anti-freeze mixtures in it.

Sediments and impurities, when present, can be removed from the cooling system in the following way:

— fill the radiator with water containing about 7 ounces (200 gr) of bicarbonate of soda and let the engine run for about half an hour at medium speed, then empty the radiator. Flush out by running water through it for a few minutes; then fill up again with clean water, and let the engine run again at idling speed. Then fill the radiator to its normal level.

This flushing should be carried out before putting in an anti-freeze mixture for the winter, seeing that the mixture tends to loosen the sediment and rust which accumulate in the various passages and in the water jacket.

ANTI-FREEZE MIXTURES

Good anti-freeze preparations are available on the market, but car Owners who wish to prepare themselves an anti-freeze mixture should not neglect that neutral glycerine in water is more suitable than water and methylated spirit, because, owing to its high rate of evaporation, spirit must be frequently added to maintain the correct proportion.

Any other solution, and particularly those containing chloride of lime, are bad for the aluminium cylinder head.

The proper proportions are as follows:

Specific gravity at 15° C (59° F)	Glycerina (percentage in volume)	Glycerina (litres)	Water (litres)	Freezing point
1,049	15	0,7	3,8	- 4° C (25° F)
1,070	25	1,2	3,3	- 8° C (18° F)
1,115	35	1,6	2,9	- 14° C (7° F)
1,129	40	1,8	2,7	- 18° C (0° F)
1,144	45	2,1	2,4	- 22° C (- 8° F)
1,160	50	2,25	2,25	- 26° C (-15° F)

In the event, however, that local prices or particular conveniences should render it preferable to use methylated spirit instead of glycerine, anti-freeze mixtures can be obtained according to the following percentages:

Specific gravity at 15° C (59° F)	Methylated spirit (percent. in volume)	Methylated spirit (litres)	Water (litres)	Freezing point
0,969	26,50	1,2	3,3	- 9° C (16° F)
0,965	30,00	1,4	3,1	- 12° C (10° F)
0,959	35,25	1,6	2,9	- 14° C (7° F)
0,956	37,40	1,7	2,8	- 15° C (5° F)

NOTE. — A litre is about 1¾ pints.

Care should anyway be taken to add spirit periodically, so to compensate the loss due to evaporation.

TIGHTNESS OF DYNAMO AND FAN BELT

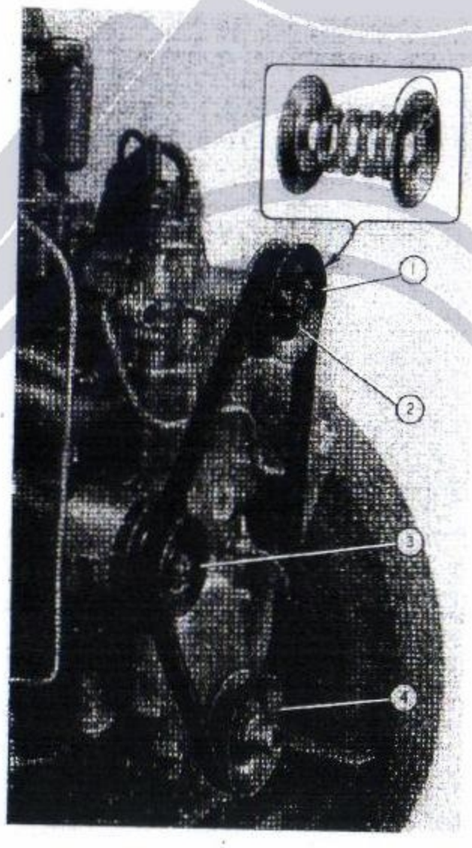


Fig. 32.
Tightening the dynamo and fan belt.

1. Driving pulley for fan.
2. Nuts to be unscrewed to dismantle the pulley.
3. Driving pulley for dynamo.
4. Driving pulley on the crankshaft.

Every 1800 miles (3000 km): Check the belt for tightness and, if necessary, stretch it.

When the belt becomes slack, it slips, surges and makes a characteristic noise. The fan becomes inefficient and the engine tends to overheat. The three nuts should therefore be unscrewed that fix the pulley to the hub, and then one or two of the rings (according to the degree of slackness of the belt) which form the bottom of the pulley groove should be removed to the outer sides, whereupon the pulley may be reassembled (Fig. 32).

BEARINGS OF FAN SPINDLE

Every 6000 miles (10.000 km): Remove the cylinder head cover, slide off the fan splindle and apply Fiat GCS 15 grease to the ball bearing of the bush.

IGNITION

IGNITION DISTRIBUTOR

Every 600 miles (1000 km): Screw up the greaser for one or two turns.

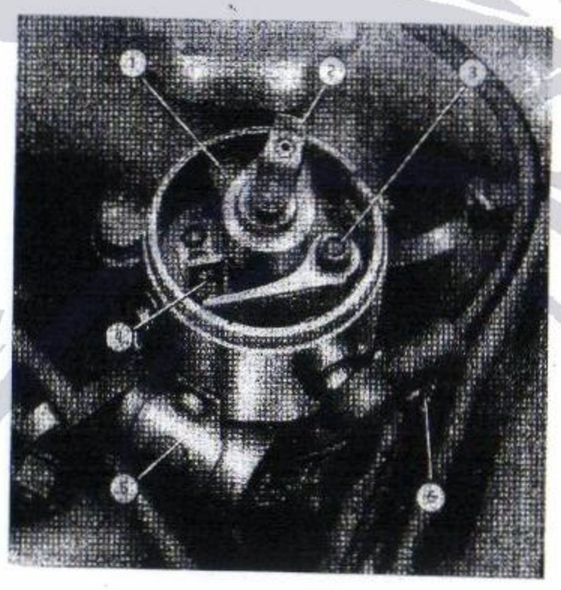


Fig. 33. - Ignition distributor, the head being removed.

1. Cam lubrication wick. - 2. High-voltage revolving brush. - 3. Lubrication wick for pivot of the lever carrying the movable platinum point. - 4. Screw and lock nut for adjusting the gap between the platinum points. - 5. Condenser. - 6. Greaser of control spindle.

Every 1800 miles (3000 km): Refill with Fiat GCS 22 Grease the greaser and slightly smear with Fiat F oil the wick of the breaker cam.

The breaker points should always be free from grease so as to prevent them being worn away too quickly. If the points are

dirty (greasy) they should be cleaned with a rag moistened with gasoline, taking care that no foreign substances remain between the points. If the points are oxidized, chipped or unevenly consumed they should be filed and the gap should be adjusted again. Never use emery cloth or other abrasives.

The contact point opening is adjusted by means of the screw which carries the stationary platinum point and which is subsequently set in position by its lock nut (Fig. 33).

The gap should be from .019" to .021" (0,47 to 0,53 mm).

SPARK PLUGS

Every 1800 miles (3000 km): Clean the points with a wire brush dipped in gasoline and check the gap which should be between .020" and .024" (0,5 mm to 0,6 mm).

If the gap has become wider through long use, the outer point must be brought closer to the inner one.

If the porcelain has become blackened by carbon deposits turn the plug upside down, pour a little alcohol or gasoline into it and, after a few minutes, brush with a wire brush.

TIMING THE IGNITION

Should the ignition distributor spindle or the camshaft have been removed it is necessary to time the ignition in the following manner:

— Bring the crank of cylinder No. 1 to a position 10° * before the top dead center in the compression stroke. See that both valves are closed.

If the engine has been taken off the car, check the piston displacement by means of a graduated quadrant to be fitted to the flywheel. If instead the engine is still on the car, note the reference marks on the cover of the timing gears and on the rim of

* See note on page 16.

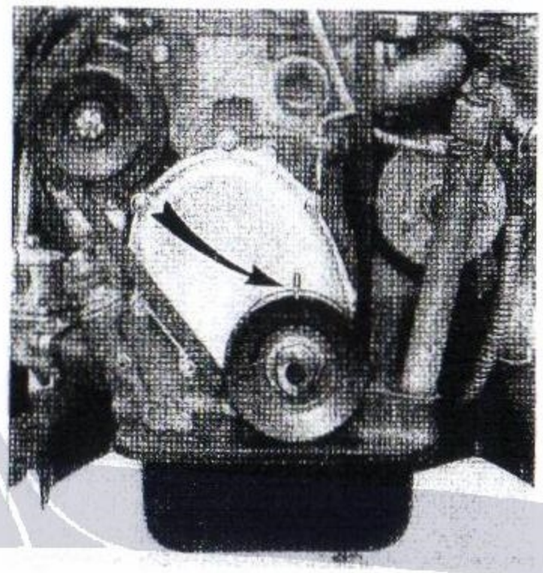


Fig. 34. - Reference marks for timing the ignition (when the engine has not been removed).

The arrow points to the reference marks on the cover of the timing gears and on the pulley fitted to the crankshaft. They must be in opposition when the piston of cylinder No. 1 is at t.d.c.

the pulley which is carried by the crankshaft (Fig. 34). The long notch on the pulley rim should be from .32 to .35 in. (8 to 9 mm) before the notch on the cover.

— Take off the ignition distributor head and turn by hand the distributor spindle so as to bring the rotating brush towards the contact corresponding to the firing of cylinder No. 1 (Fig. 35). The numbers marking the correspondance with the cylinders are stamped on the distributor head.

— See that in this position the platinum contact points are just about to begin parting (make sure first that the maximum gap is .019" to .021" as prescribed — 0,47 mm to 0,53 mm).

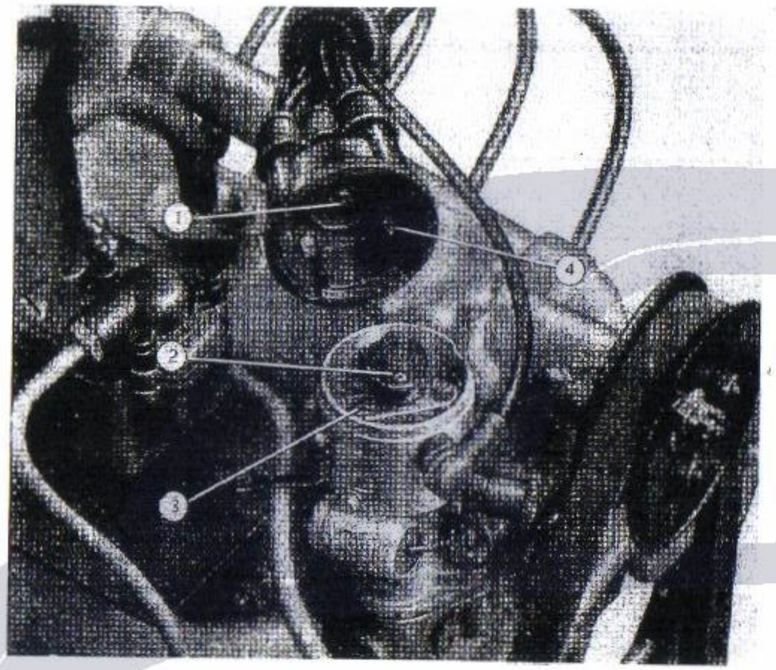


Fig. 35. - Timing the ignition distributor.

1. Carbon point of current to revolving brush. - 2. Revolving brush in position for firing cylinder N. 1 - 3. Platinum points, with a gap of 0,19" to 0,21" (0,47 mm to 0,53 mm). - 4. Contact for spark plug cables.

— At this point, without moving the distributor drive spindle from its present position mount the lower coupling on the serrated end of the driving shaft, and at the same time fit the support to the stud for its fixing to the engine.

— See that the cables are correctly connected to the spark plugs.

If no other operation has been effected on the engine but the removal of the distributor, this can be fitted again without any need of a further timing.

CHASSIS

TRANSMISSION

CLUTCH PEDAL PLAY

Every 1800 miles (3000 km): See that the clutch pedal is so adjusted as to have at its end a half to three-quarter inch (14 mm to 18 mm) of free travel before actuating the clutch. Should

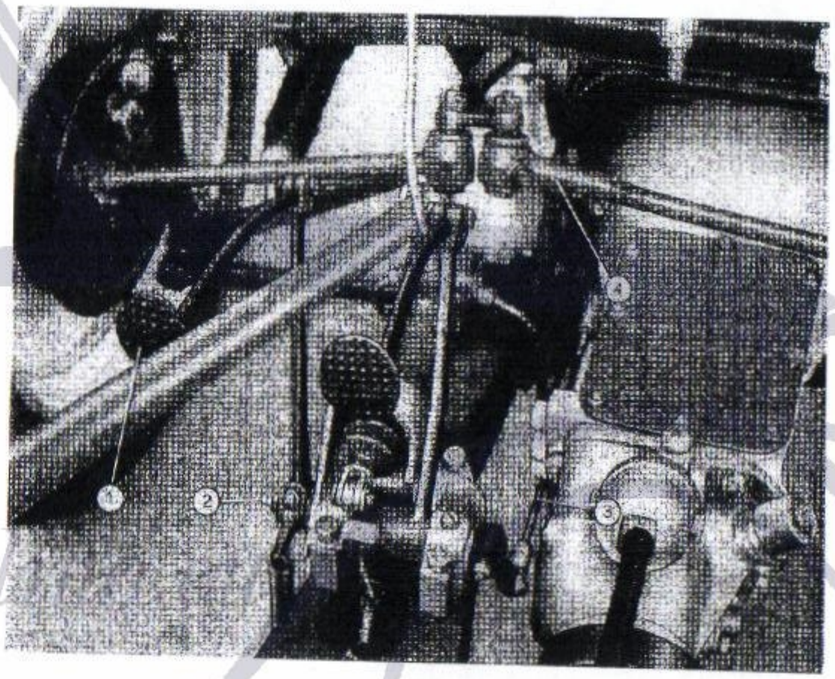


Fig. 36. - Adjusting clutch pedal play.

1. Clutch pedal. - 2. Grease gun nipple for pedal shaft. - 3. Pull rod that must be unscrewed for adjusting the play. - 4. Sleeve for adjusting the toe-in of the front wheels.

it be necessary, owing to wear of the clutch facings having reduced or annulled this free travel—in which case the clutch tends to slip—to make a readjustment, the pull rod (3, Fig. 36) controlling the horizontal clutch lever must be slackened back and fixed in the new position by means of the lock nuts provided.

If the unscrewing of the pull rod is not sufficient to obtain the desired adjustment, this shows that the clutch facings are worn out and must be replaced.

GEAR BOX

Every 1800 miles (3000 km): Check the oil level through the filler hole on the left side of the box and, if necessary, fill up to correct level with Fiat C P Oil.

Every 6000 miles (10.000 km): Empty, wash out with kerosene, allow to drip dry and refill.

PROPELLER SHAFT

Every 600 miles (1000 km): Squirt some Fiat E Oil into the grease gun nipple on the front sliding sleeve.

REAR AXLE

Every 1800 miles (3000 km): Check the oil level by means of the plug on the rear cover of the casing and, if necessary, fill up to correct level with Fiat C P oil.

Every 6000 miles (10.000 km): Empty, wash out with kerosene, allow to drip dry and refill. This operation must be effected by a Service Station.

BRAKES

PEDAL SHAFT

Every 1800 miles (3000 km): Inject Fiat E Oil in the grease gun nipple at the end of the brake pedal shaft.

BRAKE FLUID RESERVOIR

Every 1800 miles (3000 km): Inspect the level of the Lockheed fluid and, if necessary, fill up to « Max » level marked outside the reservoir.

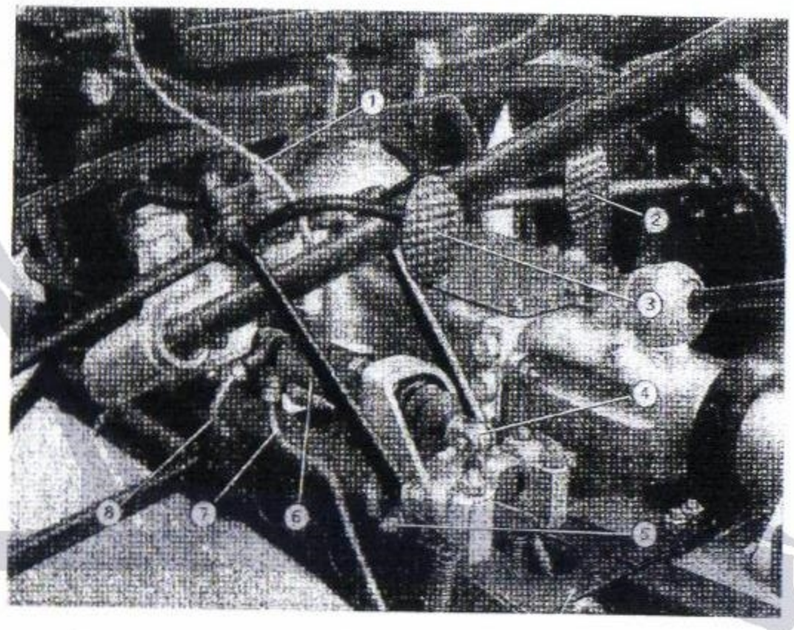


Fig. 37. - Pedals and hydraulic brakes master cylinder.

1. Pipe for Lockheed fluid from reservoir. - 2. Hydraulic brake pedal. - 3. Clutch pedal. - 4. Push rod for master-cylinder plunger control. - 5. Grease gun nipple for pedal shaft. - 6. Master cylinder for braking system. - 7. Delivery pipe for rear wheel cylinders. - 8. Delivery pipe for front nearside wheel cylinder.

Fig. 38.
Reservoir for hydraulic brake fluid.

1. Cap. with bayonet joint.
2. Maximum level of fluid.
3. Minimum level of fluid.

General Inspection. — Make sure that:

1) All pipe lines are in perfect condition, without being cracked or dented, perfectly centered with regard to the holes on the frame and away from sharp edges.

2) The rubber connections have not been damaged by coming into contact with oil or grease.

3) All pipe clips are thoroughly tightened to prevent vibration of the tubing and possible fracture.

4) No leakages are detected. If it is not so, the connections should be tightened, taking care not to twist the pipes.

5) The supply tank is threequarters full of brake fluid. Do not use any substitute for the special brake fluid. Any other fluid might damage the rubber cap washers in the system.

Avoid the brake fluid being spilled on the cellulose finish of the bodywork.

6) The clearance between the master cylinder pistons and the push rods is the correct one. The corresponding free movement of the pedal should be .27 to .32 in. (7 to 8 mm) measured at the head of the pedal.

Bleeding the brake system. — If for some reason or other the braking system has been drained, or if a connection in the piping has been loosened, it is necessary on refilling the system to bleed the pipes by actuating the pedal and operating with each wheel as follows:

— Remove the cap (5, Fig. 39) and the connection on the wheel-cylinder and screw up instead a special connection fitted to a small hose for outletting the fluid.

— Place the end of this hose into any vessel of transparent glass which has already been partially filled with the fluid.

— Actuate slowly and several times the brake pedal so that the fluid comes out into the vessel. Air bubles will be noticed, and the pedal should be actuated until no longer bubbles issue with the fluid.

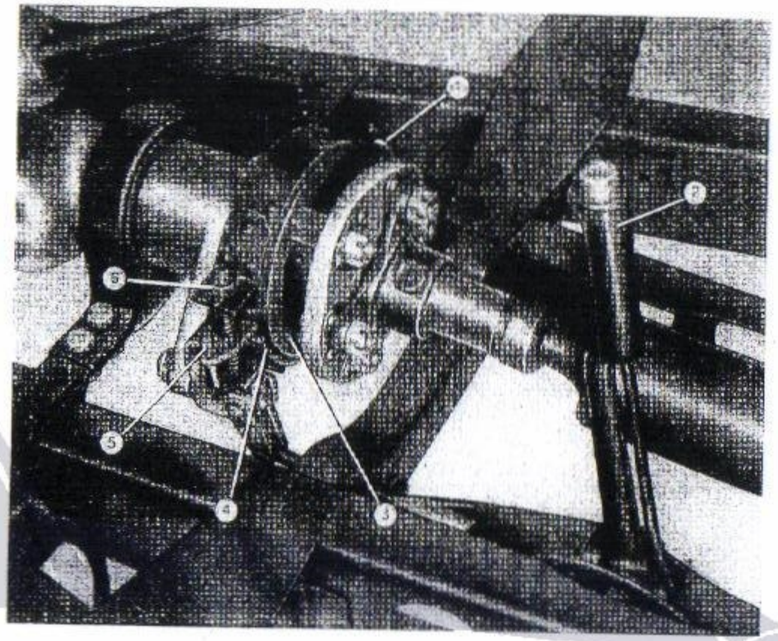


Fig. 40. - Brake on the transmission.

1. Screw for centring the brake band. - 2. Hand control lever. - 3. Brake drum. - 4. Brake band. - 5-6. Pull rod nuts for adjusting the clearance between brake band and drum.

— Remove the hose together with its connection and put in place the proper plug and connection.

While carrying out this operation make often sure that the fluid level in the reservoir is high enough.

If the bleeding of the system has been properly effected, on depressing the pedal there will be noticed—after the free initial displacement—a direct action on the fluid, that is without resilience.

If on driving the car the brake pedal gives exceedingly in when depressed, this means that there are vapour or air bubbles in the piping. A bleeding should therefore be effected actuating repeatedly the pedal so that the bubbles are compelled by the moving fluid to issue in the pump wherefrom they are easily outlet in the reservoir.

TRANSMISSION BRAKE CLEARANCE

Every 1800 miles (3000 km): Check the clearance between brake drum and band which should be about .02" (0,5 mm). If not so the screw (1, Fig. 40) must be so adjusted as to bring the

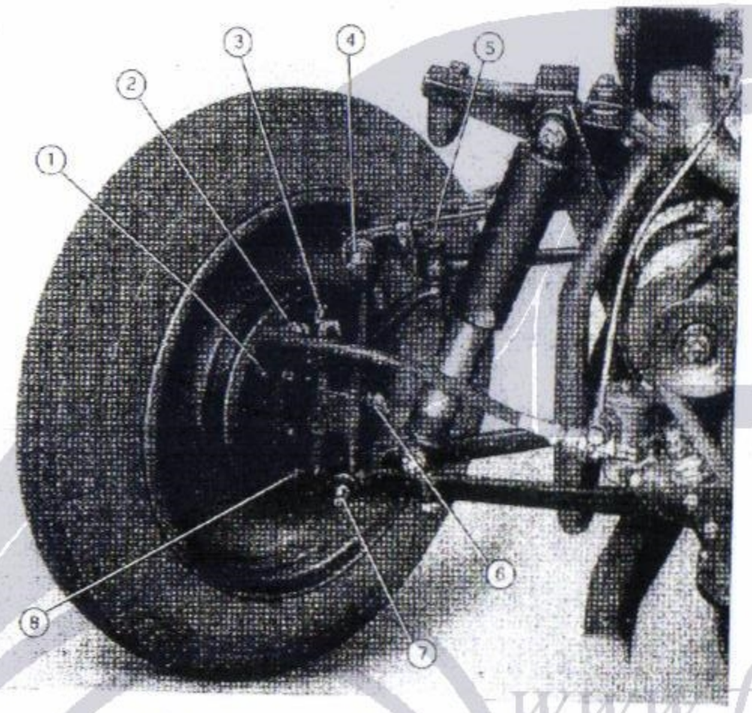


Fig. 41. - Detail of a front wheel.

1. Cam for adjusting the clearance between brake shoe and drum. - 2. Fluid inlet connection for wheel cylinder. - 3. Connection and plug, to be replaced by a suitable one, when purging the brake pipe lines. - 4-5-6-7. Grease gun nipples. - 8. Eccentric pivots for brake shoes articulation.

centre line of the band closer to the drum, and then the nuts (5 and 6, Fig. 40) of the stretchers on the ends of the band must be suitably adjusted.

The inspection and the adjustment of the transmission brake can be effected without jacking up the car.

The adjustment may be delayed up to every 6000 miles (10.000 km) if the hand brake is not used often.

SUSPENSION

ARTICULATION OF FRONT ROAD SPRING AND SWINGING RADII

Every 600 miles (1000 km): Squirt Fiat E oil in the two grease gun nipples of the articulation pins of the transversal spring, also in the four gun nipples of the swinging radii articulation pins for the front suspension.

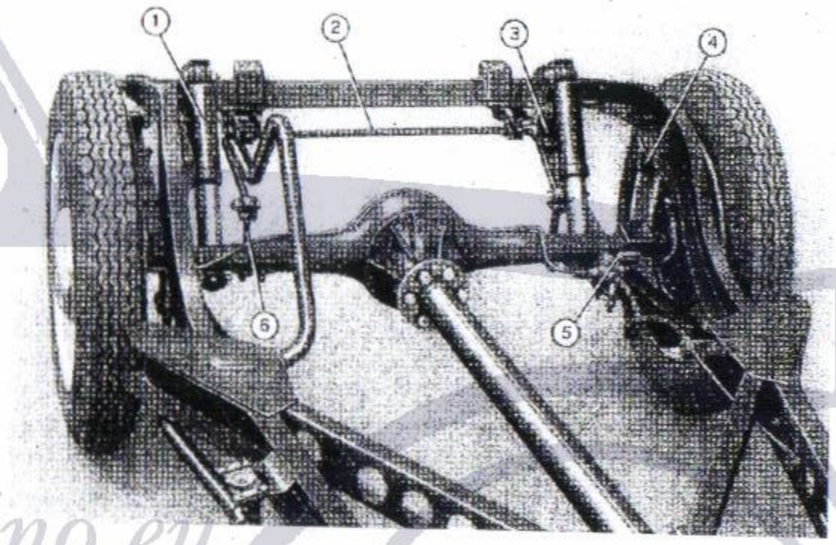


Fig. 42. - Rear suspension of chassis.

1. Double-action hydraulic shock absorber. - 2. Stabilizing bar. - 3. Semi-elliptic spring. - 4. Deadening rubber block. - 5. Clip for fastening the spring to rear axle casing. - 6. Fork lever connecting the stabilizer bar to the rear axle casing.

FRONT AND REAR SEMI-ELLIPTIC SPRING

Every 1800 miles (3000 km): Wash with kerosene and inject graphited oil between the leaves. To take the load off the springs lift the car with a jack until the wheels are off the ground, then take off the stirrups binding the leaves together.

While oiling the spring leaves take care not to smear the varnish of the body work.

HYDRAULIC SHOCK ABSORBERS

Every 6000 miles (10.000 km): Have the level inspected by a Service Station and, if necessary, add Fiat S.A.I. Oil.

The oil in the shock absorbers becomes hot during the long travels owing to the continual variations of pressure, and although every care has been taken to ensure a perfect oil seal, leaks may take place.

It is therefore advisable, any time the damping action of the shock absorbers grows irregular, to have the shock absorbers inspected by a Service Station.

STEERING AND WHEELS

STEERING BOX

Every 1800 miles (3000 km): Inject Fiat E Oil in the oil gun nipple on the steering box. In the event however that the steering box has been dismantled, it should be refilled with Fiat C P Oil.

PLAY BETWEEN WORM AND WORM SECTOR

Every 1800 miles (3000 km): Check the play between worm and worm sector and, if necessary, correct it by turning the eccentric bush that carries the sector spindle. The proceeding is as follows:

— Take down the steering arm and its packings.

— Unscrew the screw (2, Fig. 43), holding the adjusting plate, turn the eccentric bush by means of the adjusting plate, so as to bring the sector nearer to the worm, and at such an angle as to make it possible to fix the adjusting plate again through the second hole.

— Should the adjusting plate be already fixed at the second hole and consequently, by turning it, it is no longer possible to fix it in position again, it must be taken right off the bush and replaced turned one notch.

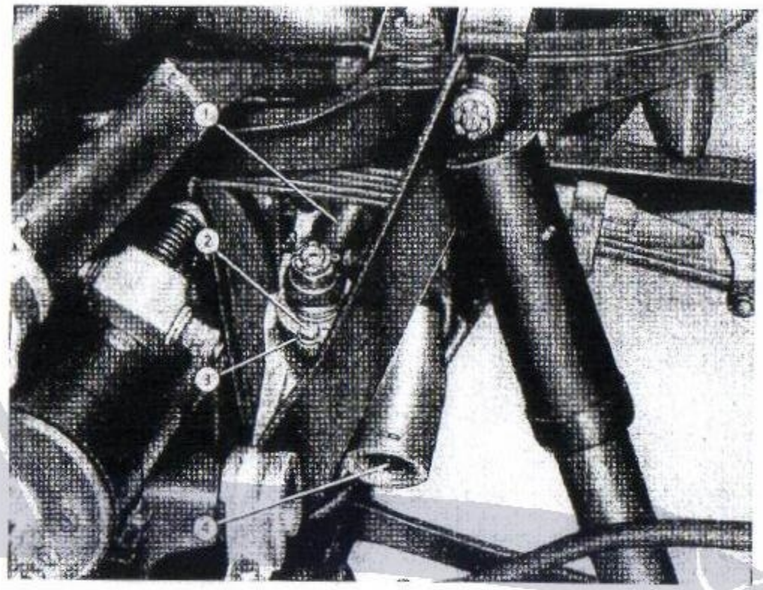


Fig. 43. - Taking up the play between steering worm and worm sector.
1. Steering arm. - 2. Screw holding the adjusting plate in position. - 3. Adjusting plate for play between worm and worm sector. - 4. Threaded cap for adjusting the roller bearings of steering worm.

Play in the roller bearings of the worm is taken up by means of the cap situated on the end of the steering box (4, Fig. 43).

Both adjustments should be made in such a manner as to eliminate all play in the steering column, without making the steering too stiff.

STEERING RODS

Every 1800 miles (3000 km): Squirt some Fiat E oil into the four oil gun nipples of the two steering rod ball joints.

Every 6000 miles (10.000 km): Inspect the ball joints of the steering rods and dismantle, clean and lubricate every steering part.

At the same time the front wheel alignment should be checked, not only to ensure stability but also to prevent the abnormal wear of the front wheel tyres.

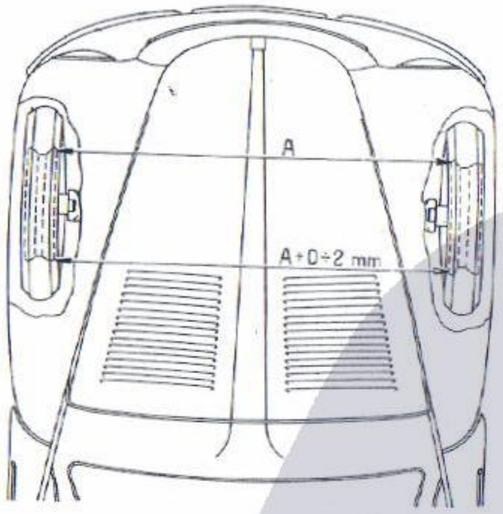


Fig. 44.
Toe-in of the front wheels measured between the rims.

The wheel alignment might have been altered after a collision with a high curb or other obstacles, also when the steering joints wear away or owing to other reasons.

The adjustment data are as follows:

Convergence of the front wheels (measured between the rims) . 0 to .08 inches (0 to 2 mm)

Inclination of front wheels (measured between the rim edges) with normal load . . . . .27 inches (7 mm)

FRONT WHEEL STEERING KNUCKLES

Every 600 miles (1000 km): Squirt some Fiat E oil into the two grease gun nipples situated on the upright arm of the steering knuckle pillar.

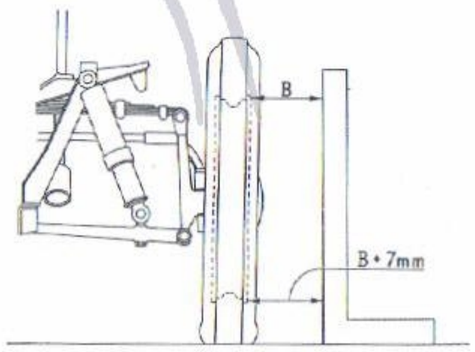


Fig. 45.
Dishing of the front wheels (with normally loaded car).

FRONT WHEEL BEARINGS

Every 1800 miles (3000 km): Fill the caps of the front wheel hubs with Fiat A 11 grease and screw home.

Every 6000 miles (10.000 km): Check the play in the bearings and, if necessary, adjust them by means of the nut that fixes the bearing on the hub.

REAR WHEEL BEARINGS

Every 6000 miles (10.000 km): Take off the wheel and the hub, and refill with Fiat A 11 grease the inner bearing.

TYRES

Every 180 miles (300 km): Check the air pressure by means of a gauge. It is also advisable to check the tyre of the spare wheel.

Do not neglect the pressure until the tyres visibly flatten under the weight of the car because, even when the pressure is only 1/10 below the prescribed figure, the fabric of the covers becomes heated when the car is running and in time gets weak, whilst the rubber also heats and tends to crack.

It must be remembered that the road holding qualities of the car are affected by underinflated tyres, which also wear out more quickly and diminish the braking efficiency.

The tyre pressure should therefore be checked periodically with a suitable gauge and at the same time the treads should be examined for cuts, which should be repaired at once as they allow water and other substances to penetrate and weaken the fabric with consequent danger of a blow-out.

It is advisable to replace, every three or four months, one of the wheels by the spare one, because tyres, when not in use for a long time, deteriorate through the combined action of sun and air.

It is advisable to remove the outer covers every 6 months, to inspect the fabrics and to powder the inside of them with French chalk. There operations should be performed also each time the tubes are repaired.

Exceedingly patched tyres should never be used; they upset the balance of the wheels and are dangerous, especially at high speeds.

Also there should not be altered the position of the tyre with respect to the wheel.

Pirelli tyres have the lighter portion marked by a red disc which should coincide with the inner tube valve.

Michelin and Ceat tyres have the lighter portion distinguished simply by the shop number; and other Makes by similar indications.

ELECTRICAL EQUIPMENT

GENERATOR AND STARTING

BATTERY

Every 600 miles (1000 km): Check the level of the electrolyte in the cells and, if necessary, add distilled water so that the level gets nearly half inch (1 cm) above the plates.

In summer it is advisable to effect this inspection oftner.

Only « pure » water should be added. Distilled (but not merely boiled) water; melted artificial (but not natural) ice or rain water (provided it has not been in contact with metals) are satisfactory. Water for battery use should be kept in clean, covered vessels of glass, china, earthenware, plastic, ebonite or rubber. The only metal vessels allowed are those of lead.

The electrolyte is a mixture of pure water and pure sulphuric acid. Water evaporates or may get transformed into gases which escape, while sulphuric acid does not. This is the reason why it is necessary to add water and, in no case, acid.

While preparing the electrolyte it would be **dangerous** to pour water in the acid. Pour instead the sulphuric acid upon the water.

If a cell is found to have a notably lower level than the others, the reason is probably due to a leak, and in such a case the box should be reparaid at once by a Service Station.

Every 1800 miles (3000 km): Make sure that the battery posts and connectors are clean and tightened, coating them afterwards with yellow vaseline for preventing the oxidization.

Never allow the battery to get completely discharged to avoid sulphation. If the car is not used during a long time, have the battery charged once a month.

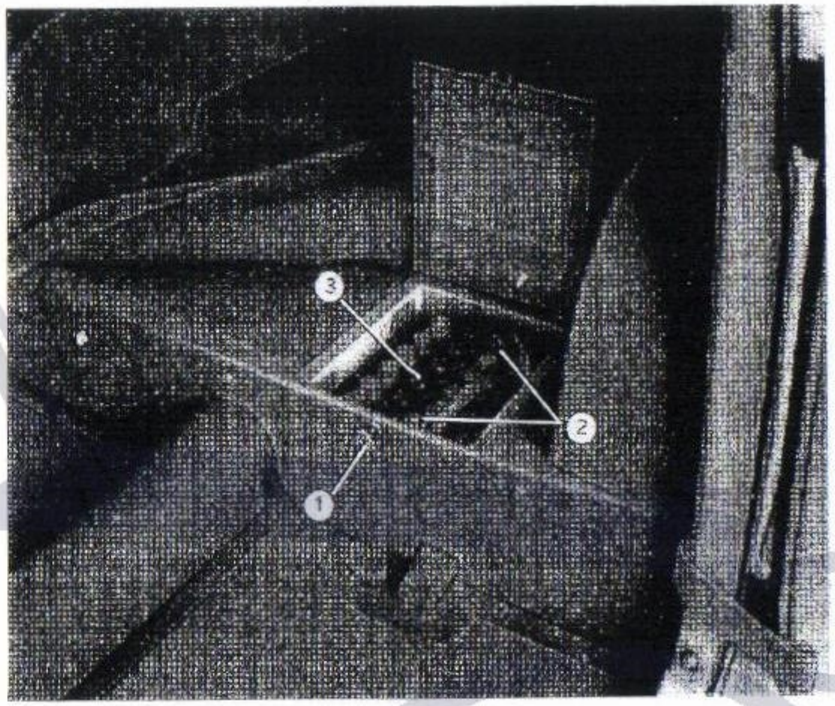


Fig. 46. - Arrangement of the battery.

1. Knob for fastening the lid of the battery box. - 2. Positive and negative posts. - 3. Cell plugs, with breathers.

The electrolyte strength when the battery is charged should be about 1,28 (31,5 degrees Baumé) while when it is discharged may get as low as 1,20 (24 degrees Baumé) and even less.

DYNAMO AND STARTER COMMUTATOR

Every 1800 miles (3000 km): Clean it with a clean rag pressed against the bars while the engine is running slowly.

If the bars show traces of being burned, clean the commutator employing some very fine glass paper (000) pressed against the bars by means of a flat piece of wood while the dynamo is revolved slowly.

Every 6000 miles (10.000 km): Inspect the brushes which should be replaced if they are worn away or chipped, otherwise the dynamo might be damaged.

When changing the dynamo brushes, see that the new ones are of the same quality as the old ones. If they are too soft they will wear out quickly, whilst if they are too hard they will score the commutator.

DYNAMO AND STARTER BEARINGS

Every 6000 miles (10.000 km): Thoroughly clean all parts and lubricate the dynamo ball bearings with Fiat GCS 22 Grease. For the starter motor bearings use Fiat A 3 Graphited Grease; whereas Fiat GCS 22 Grease should be used for the free wheeling device.

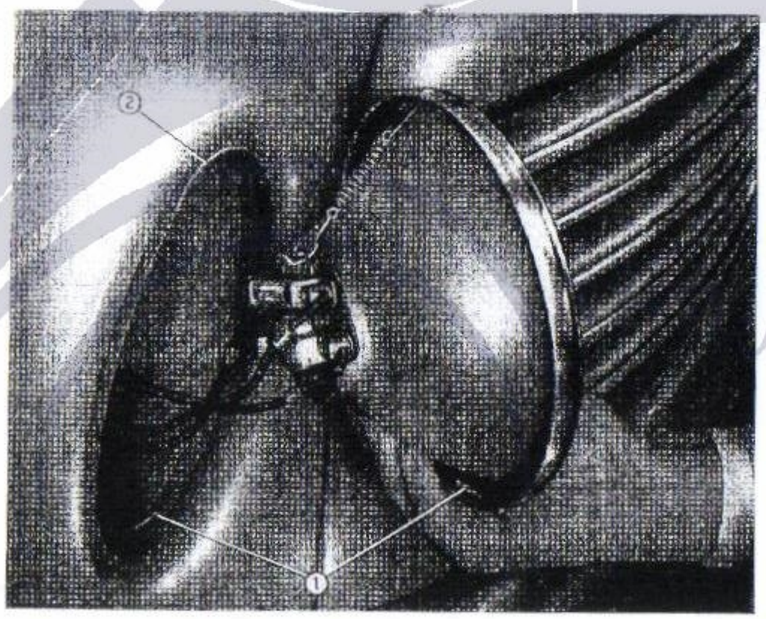


Fig. 47. - Opening the headlamps.

1. Screw to be slackned. - 2. Union rim for fitting the frame to the headlamp shell.

LIGHTING AND ACCESSORIES

REGULATING UNIT FOR THE DYNAMO

Unless by very skilled technicians this regulating unit should not be tampered with. We advise therefore car Owners to have the unit overhauled or repaired **exclusively** by Fiat Service Stations where adequate instructions and means are available.

In the event that a wireless set is fitted to the car, **never insert any condensator of any capacity for radio interference suppression** between the terminal 67 and the earthing point, or between the terminals 67 and 51 **either of the regulating unit or of the dynamo**, because by doing thus a premature wear of the contacts would ensue on the regulating unit, which normally does not originate radio interferences.

HEADLAMPS

To open the headlamps for replacing the bulbs unscrew the lock screw underneath (1, Fig. 47) — which cannot be removed — and draw the glass frame forward from the bottom, at the same time lifting it slightly so that it can be removed. Access is thus gained to the parking-light tubular bulb which can be quickly replaced as it is held in position only by the pressure of the socket plates. To replace the headlamp bulb there should first be unhooked the spring (1, Fig. 48) that fixes the socket support to the reflector, then the support should be withdrawn by slightly forcing on its upper portion so as to disengage the little tongue underneath. The bulb is fixed by a bayonet joint.

Aiming the headlights beam.

Place the car on level ground, at a distance of nearly 17 feet (5 metres), from a white screen situated in shadow, which may be the white wall of a house, and take care that the longitudinal axis of the car is perpendicular to the screen.

Draw on the screen a vertical line, corresponding to the ver-

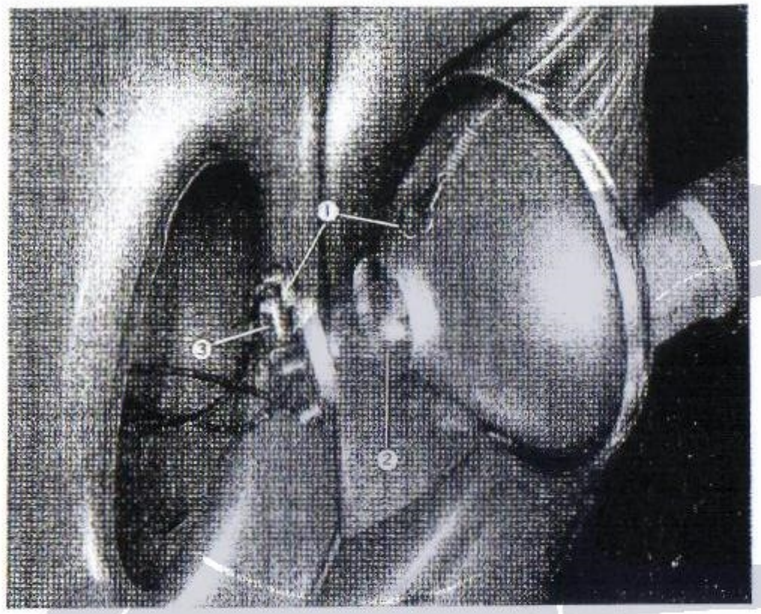


Fig. 48. - Removal of socket holder for headlight bulb.

1. Spring and hook for fixing the socket holder. - 2. Double-filament bulb for head and anti-dazzle lights. - 3. Tubular bulb for parking light.

tical axis of the car, and then trace on either side of this normal a cross; each at a height of 22¼" (56,5 cm) from the floor and at a distance of 41" (104 cm) from each other (Fig. 49).

Now, with car unladen, cast the headlamps light straight on to the screen, so as to make coincide the center of each pool of light with the cross on the same side.

For correctly aiming the headlamp, there should be slackened a little the nut that fixes its back to the bodywork.

Important. — Bulbs must not be replaced by others of a different type or power, as this would result, in the first case, in decreased illuminating efficiency, and in the second case, in a greater consumption of current than the dynamo can supply to the battery, which thus gradually becomes discharged.

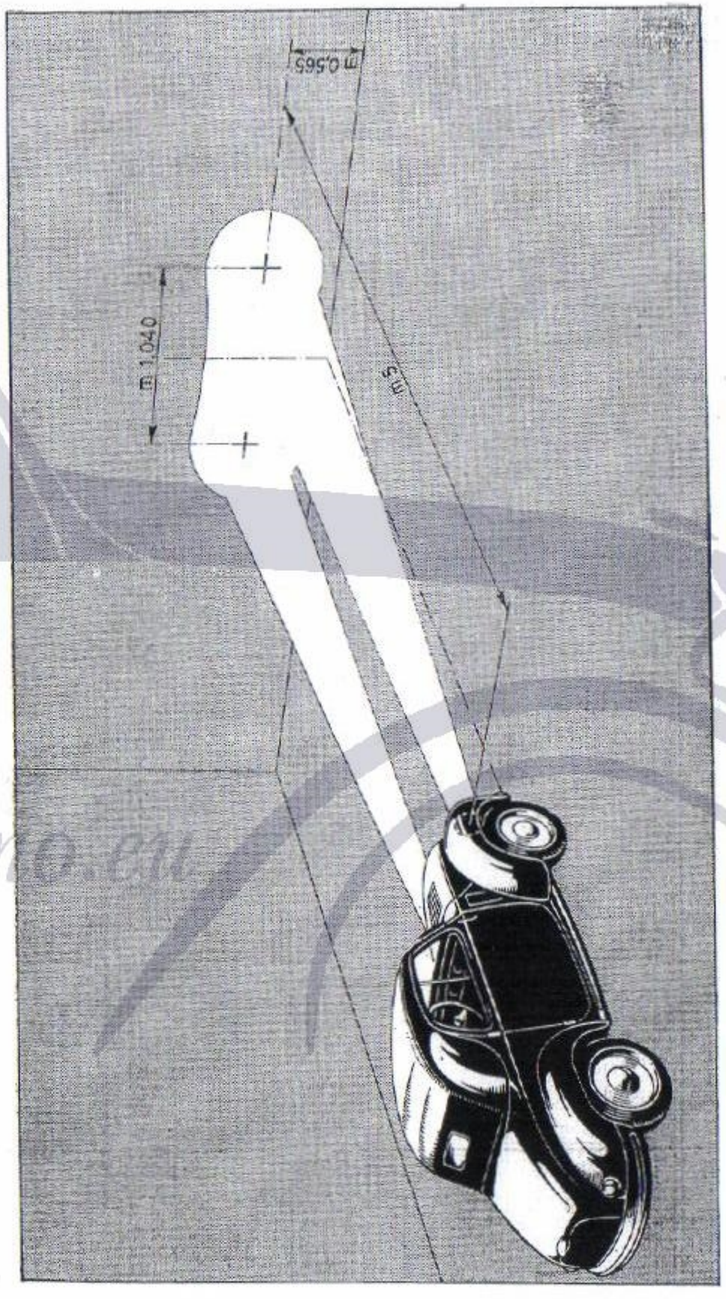


Fig. 49. - Checking the headlights direction.

TAIL LAMP

Access to the lamp for replacing the tubular bulb is gained by unscrewing the two lower farthest screws and taking off the unit that carries the glass and the bulb holder (Fig. 50).

The bulb is maintained in position by spring sockets.

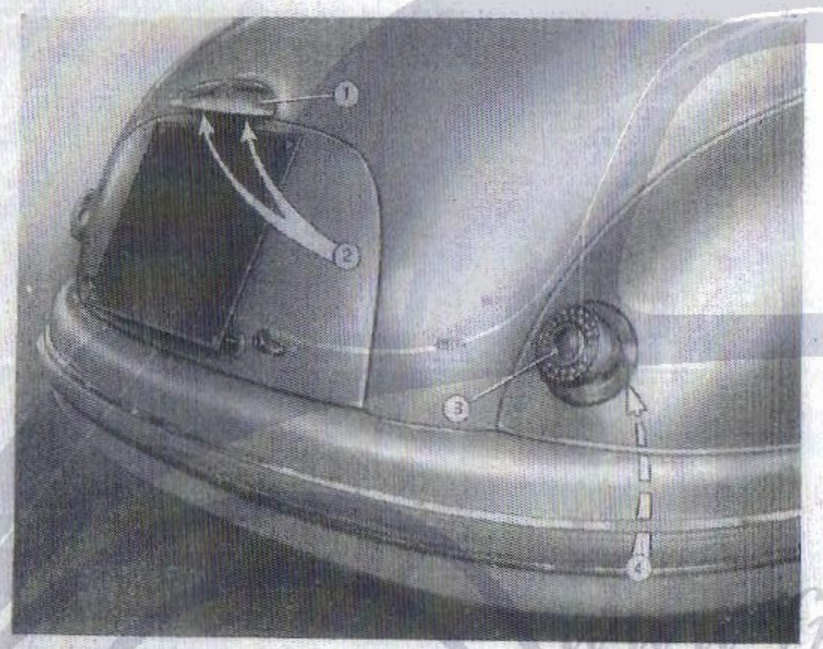


Fig. 50. - Opening the tail lamp and the rear width and braking lamps.

1. Tail lamp. - 2. The arrows point to the screws that must be slackned to gain access to the bulbs. - 3. Rear width and braking lamp. - 4. The arrow shows the position of the bracket for fixing the lamp.

REAR WIDTH AND BRAKING LAMPS, WITH REFRACTION GLASS

To replace the ball bulb within the lamp, unscrew the two nuts that fix the lamp bracket on the inner side of the wing (Fig. 50). Access to the bulb can be slightly different on these lamps according to the Make.

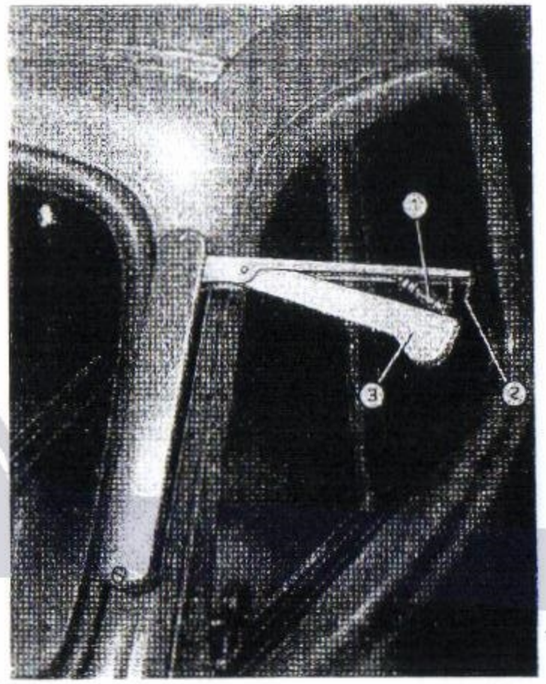


Fig. 51.
Replacing the direction indicators bulb.

1. Tubular bulb.
2. Clip for fastening the two portions of the trafficator.
3. Trafficator, of red celluloid.

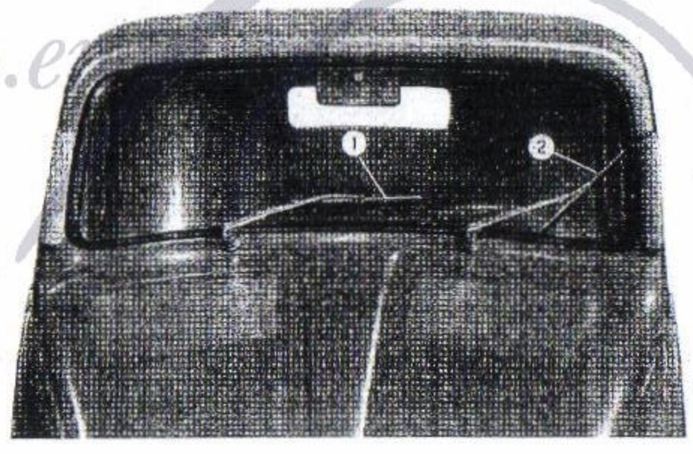


Fig. 52. - Arrangement of the windshield wipers.

1.-2. Correct position of the wipers when they have attained to end of their nearside stroke.

Combinations obtainable with the switch for outside lighting

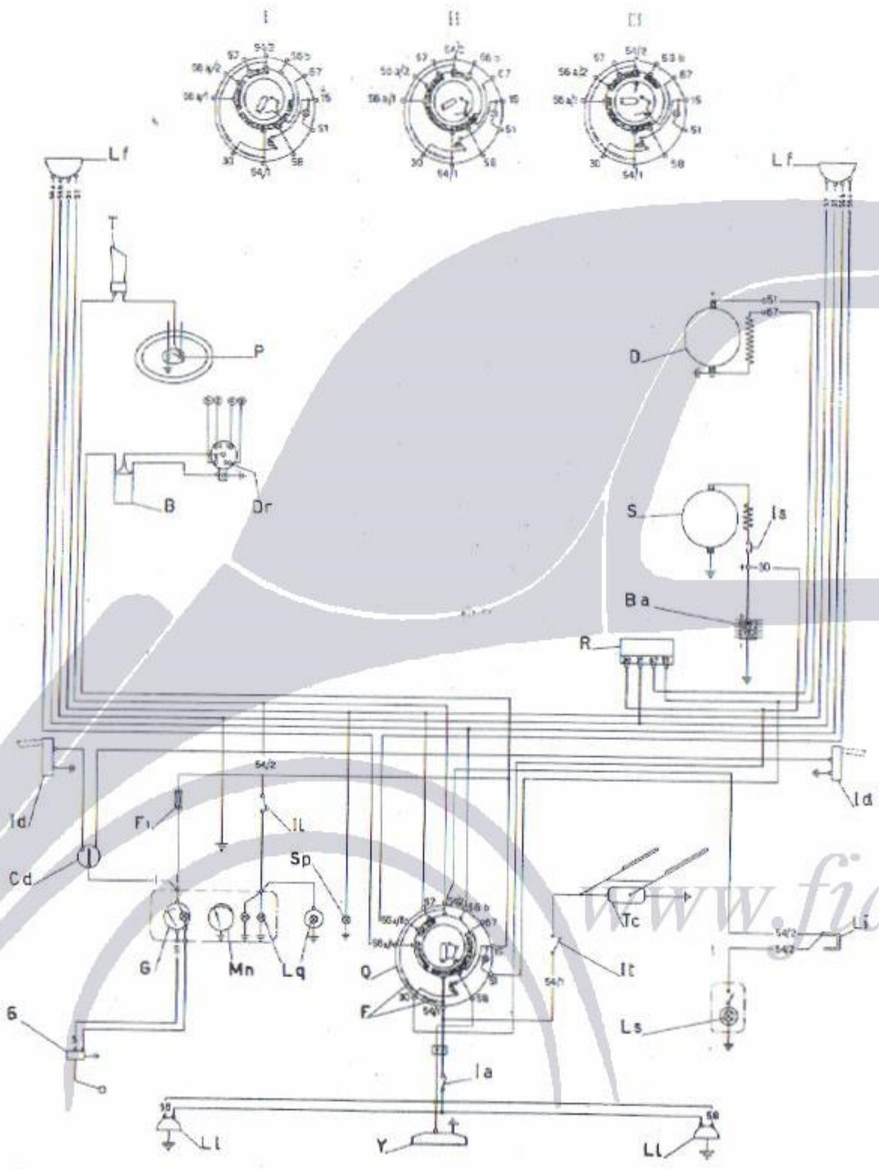


Fig. 53. - Wiring diagram.

B. Ignition coil. - Ba. Battery. - Cd. Direction indicator switch. - D. Dynamo. - Dr. Ignition distributor. - Ia. Braking light switch. - Id. Direction indicators. - Il. Switch for instrument board lights. - Is. Starter switch. - It. Windshield wiper switch. - F-F1. Fuses. - G. Dial and control of fuel gauge, with warning light for the reserve. - Lf. Headlamps. - Li. Plug for inspection lamp. - Ll. Rear width and braking lights, with catarefractor. - Lq. Instrument board lights. - Ls. Interior lighting lamp. - Mn. Oil gauge (in a single piece with the fuel gauge). - P. Horn push button. - Q. Outside lighting switch, with ignition switch and tell-tale light for the generator charge. - R. Regulating unit. - S. Starter motor. - Sp. Tell-tale light for the parking lights. - T. Horn. - Tc. Windshield wipers. - Y. Tail light, braking light and catarefractor.

DIRECTION INDICATORS

To replace the tubolar bulb inside the trafficator, press on the clip at the outer end, so that the chromium plated rib is disengaged and the trafficator can be opened (2, Fig. 51).

Open it as required to take the bulb off the two celluloid faces. Have care that the spring plate which holds the bulb in position is providing an efficient contact. To ensure a good contact the spring plate, if necessary, may be bent a little more.

After replacing the bulb, make sure that the trafficator has been closed tightly.

WINDSHIELD WIPERS

Make sure that at rest the wipers position is as shown on Fig. 52 and that the wiper arms operate on parallel plans without strain at the joints.

Mind to smear slightly with Fiat GCS 22 Grease the articulations of the wiper arms.

FUSES FOR PROTECTION OF THE INSTALLATION

At the back of the outside lighting switch are located two fuses for the protection of the installation (Fig. 54). Should one

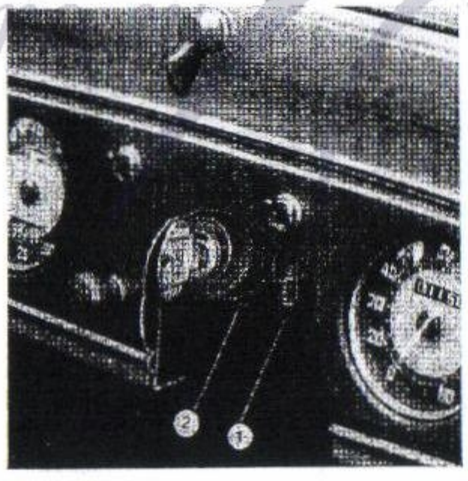


Fig. 54.
Ubication of the fuses for protection of the electrical installation.

1. Offside fuse.
2. Nearside fuse.

of these fuses get burnt out, before putting in a new one, look for the cause, i. e. the short circuit which caused the burning of the fuse. In looking for the trouble refer to the electrical equipment diagram (Fig. 53).

A further fuse is inserted in the cable for the fuel gauge.

Replacement fuses must be of 8 Amp.

BODYWORK

MAINTENANCE

OUTSIDE

The body should be washed at intervals according to the car employ and road conditions. First of all there should be washed with a jet the lower portion of the car, including the wheels, using also a sponge for the dirtier spots. Have care that the water issuing from the jet does not strike too forcibly the varnish of the wheels.

Then wash the remaining portions of the outside body, minding that the water gush be not too forcible. Whereupon complete the washing with a sponge worked on slightly at first, to prevent any particle of mud or dust that has remained stuck, from scoring the varnish, then pressing more the sponge but using still much water and washing the sponge often.

Wipe afterward all the car with a clean chamois leather so to dry all the body.

In order to avoid damaging the windshield wipers while washing the car, lift the wiper arms clear of the glass, without moving them angularly, so that the sponge or chamois leather can be passed under them.

After washing the car with water and wiping it with a chamois leather, the cellulose finish brilliance may be restored by rubbing it with cotton wool moistened with a « polish » compound. The cotton wool may get stained during the operation, but this will not affect at all the lacquer finish of the body.

To make the varnish glossiness last long care should be had:

— Not to leave for hours on end the car standing in the scorching sun and then in the open the whole night because the strong variations of temperature are detrimental to the surface of the varnish.

— Never wash or polish the car in the sun, particularly in the summer or while the bonnet is still warm after a run.

— Prevent gasoline, alcohol, soda solutions or hydraulic brake fluid from being spilled on the finish.

For the ordinary cleaning of chromiumed parts smear them with neutral vaseline and then rub with clean and soft rags or with a chamois leather.

UPHOLSTERY

It is advisable that the car upholstery and trimmings be cleaned at least once a month, employing a vacuum cleaner. Grease stains can be removed with the kind of petrol used for aviation engines or, better still, with carbon tetrachloride, applied to the stained surface. The mats may be cleaned rubbing them with a sponge dipped in gasoline.

The leather parts are cleaned washing them first with a sponge and soap and then with water only. Dry them afterwards with a chamois leather. Never use gasoline. Should the leather be hard and dry, it must be rubbed once a month with a cloth slightly moistened with linseed oil.

SLIDING ROOF

The sliding roof is of fabric with a layer of plastic material, absolutely weatherproof. All the same it is advisable never to fold it until thoroughly dry.

While folding the roof mind that the fabric does not rest on the bodywork, so to prevent the finish from being dimmed through a prolonged brushing contact.

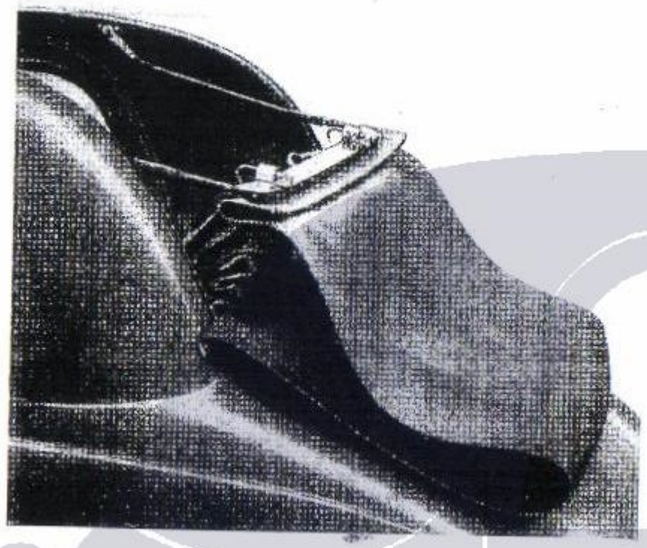


Fig. 55. - First operation for folding the weatherproof fabric of the roof.

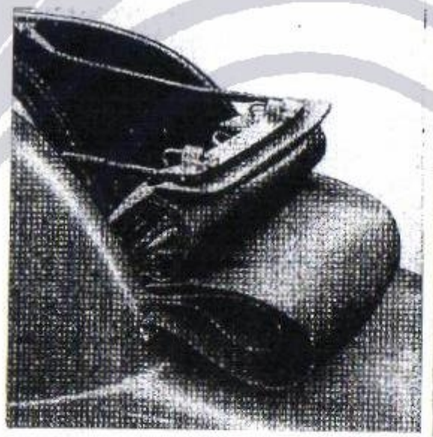


Fig. 56. - Second operation.

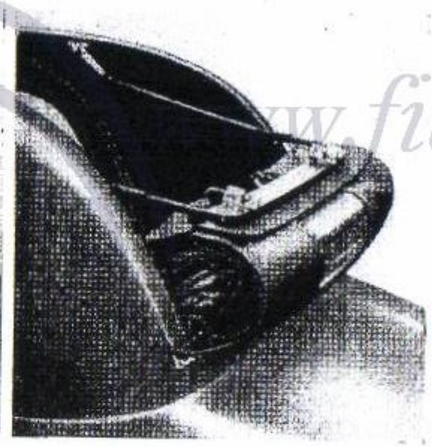


Fig. 57. - Third operation.

The correct folding of the fabric is obtained by acting thus:

— Pull the two front hooks that fix the roof and fold the fabric at the rear.

Set orderly the bows that support the fabric, spreading the latter as shown on Fig. 55.

— Fold the fabric inserting the folded portion under the last bow, so to maintain it firm under the weight of the upper bows (Fig. 56).

— Fold again the fabric, inserting the new folded portion under the first bow and block the material in this position by means of the suitable strap (Fig. 57) which should be buckled tight so to prevent the motion of the fabric while the car runs.

To clean the roof, wash the fabric with a sponge and slightly soapy water or simply clean water.

DOORS

The locks and hinges should be smeared occasionally with oil.

PERIODICAL ATTENTION

The body, being always subject to vibrations when the car is running on bad roads, as well as to the sun and rain action alternately, will always be noisy if proper maintenance operations are not periodically performed.

The body therefore should be inspected, every three or four months, by one of our Service Stations, where the fixing bolts will be tightened and the parts subject to wear carefully examined.

NOTE. — When washing the car see that no water gets into the brake drums and in contact with the brake shoes. After having washed the car, check the working of the brakes and, if the brakes do not work satisfactorily, apply them several times in order to warm up the brake shoes and so drive out the water with which they may be wet.

LONG STORAGE PERIOD

When the car is to be stored for a month or more, it is advisable to:

1) Drain the cooling system, preferably when the engine is warm.

2) Drain the gasoline tank, the fuel pump and the carburetor.

3) Clean the oil and gasoline filters.

4) Pour a small quantity of engine oil into each cylinder, through the spark plug holes, and crank the engine several times. The cylinder walls will then get coated with oil.

5) Remove the battery and store it in a fairly warm place. Recharge it once a month.

6) Remove the tyres, powder the tubes and the inside of the covers with French chalk. Place them in a room with subdued light and cool, but not damp nor draughty.

If the tyres are not removed, the car should be jacked up sufficiently for the tyres to clear the floor, while they should be inflated only sufficiently to hold their normal shape. When the car is jacked up, revolve the wheels so as to make sure that the brake linings are not rubbing against the drums.

7) Clean thoroughly the body and the chassis.

8) Smear with vaseline, or special grease, all the unvarnished metal parts.

9) Protect the car with a tarpaulin.

10) To prevent the car trimmings being damaged by insects, they should be powdered with naphtaline or camphor.

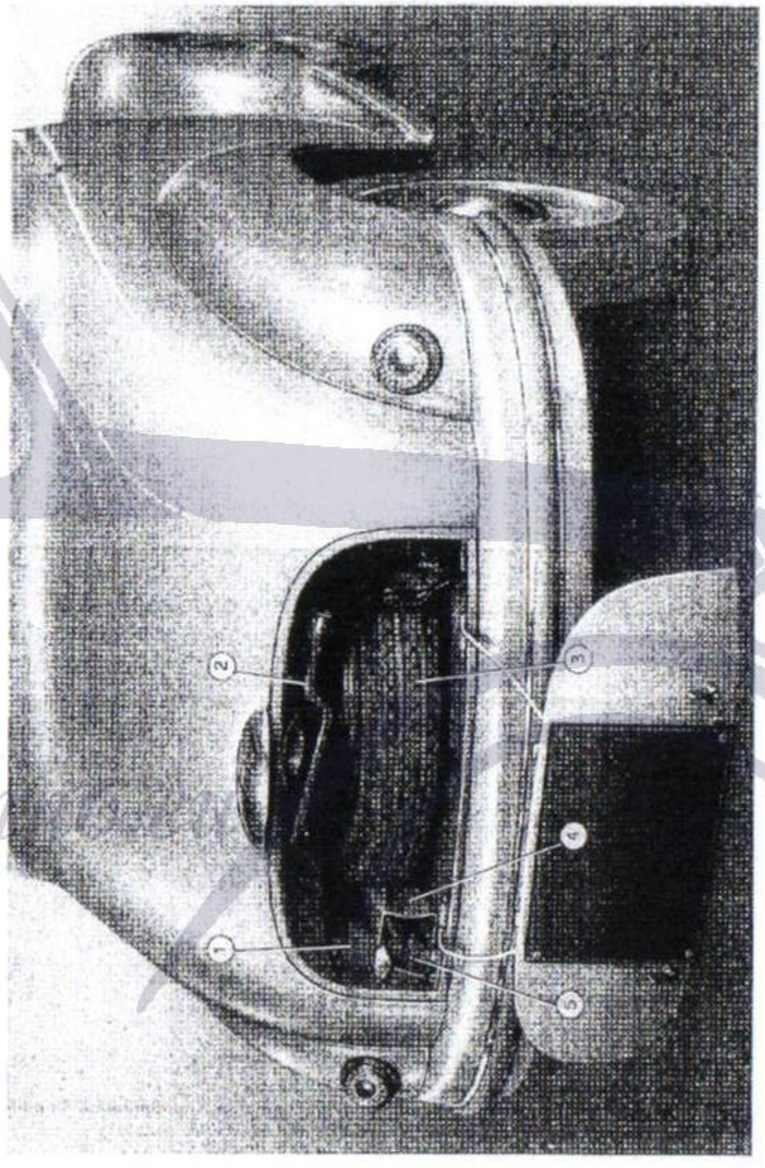


Fig. 58. - Arrangement of the spare wheel and wrenches and tools.
1. Tool bag. - 2. Handle for emergency starting. - 3. Spare wheel. - 4. Shoi for blocking the wheels. - 5. Jack.

KIT OF WRENCHES AND TOOLS

The wrenches and tools, supplied for effecting those current adjustments and check operations that the Owner can do himself, are arranged into a linen case which, together with the jack, the starting handle and the shoes for blocking the car, is stored into a receptacle at the back of the car where is housed also the spare wheel (Fig. 58).

On application there can be supplied also a supplemental tool kit including tools and devices that permit of carrying out operations more complicated.

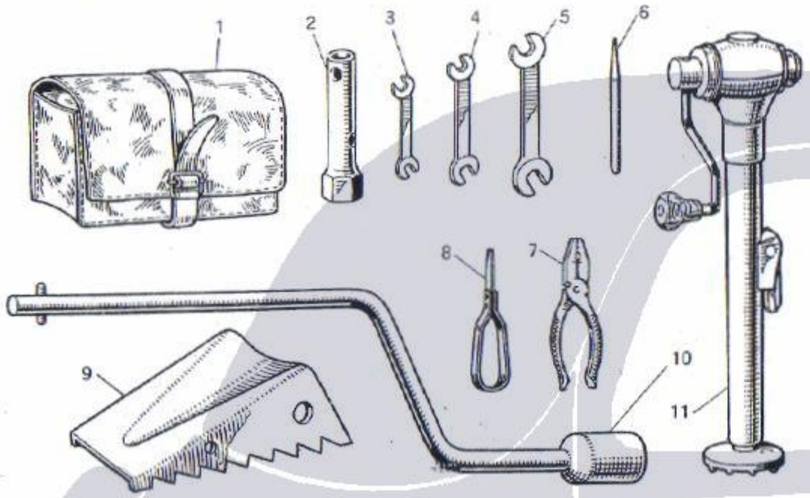


Fig. 59. - Standard equipment of wrenches and tools.

Number in the figure	TOOL
1	Complete kit bag; containing:
2	Socket wrench for spark plugs . . . . .
3	Double-end wrench: 8 × 10 mm (for wheel brake purge screws, for adjusting the tappets, for fan pulley, for oil pipes and for ignition distributor) .
4	Double-end wrench: 12 × 14 mm (for brake and fuel systems connections) . . . . .
5	Double-end wrench: 17 × 19 mm (for fuel pipes, and for screws fixing the connections to the brake cylinders and to all flexible pipes) . . . . .
6	Punch, small . . . . .
7	Pliers . . . . .
8	Average size screwdriver . . . . .
9	Shoe, for blocking the car . . . . .
10	Handle for emergency hand starting, and for the nuts fixing the wheels to the hub . . . . .
11	Jack . . . . .

RAISING THE CAR BY MEANS OF THE JACK

All the cars are provided with a jack, arranged in the receptacle at the back of the car where is housed the spare wheel. To make the jacking of the car easier and quicker, the jack should be applied to the suitable bracket arranged under both running boards, as illustrated on the Fig. 60.

Mind, before jacking the car, to put the blocking shoe, included in the kit, against either wheel on the side resting on the ground, so to prevent any motion of the car.

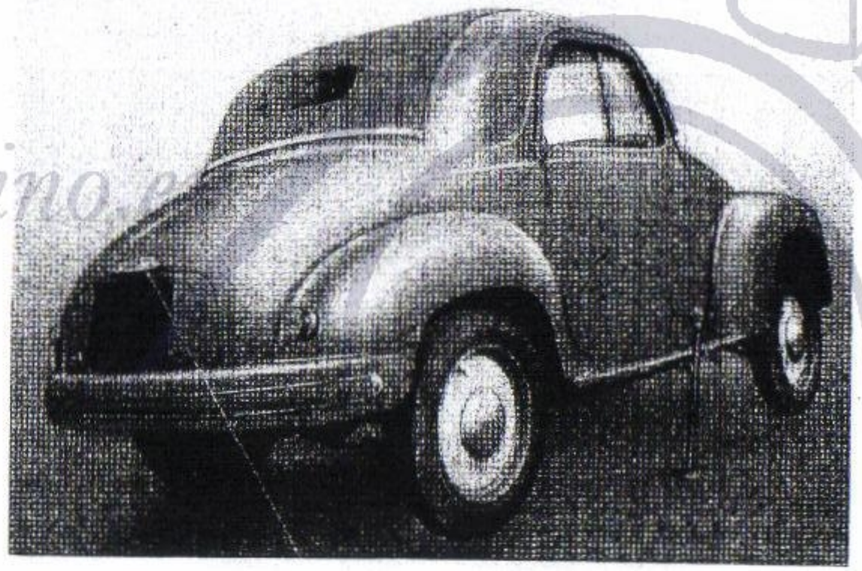


Fig. 60. - Jacking up the front of the car.

Difference of the DELIVERY VAN and BELVEDERE STATION WAGON

Fig. 61. - Delivery Van, Model 500 C.

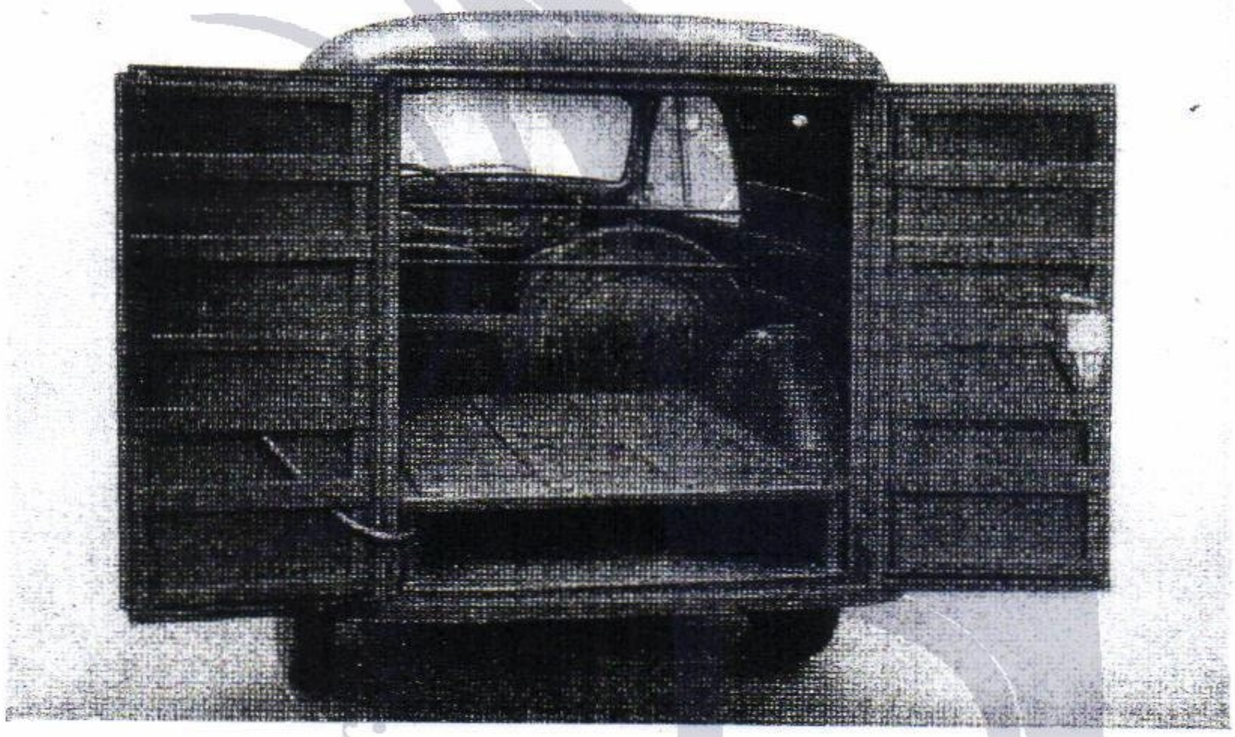


Fig. 62. - Rear view of the **Delivery Van**, with opened doors.

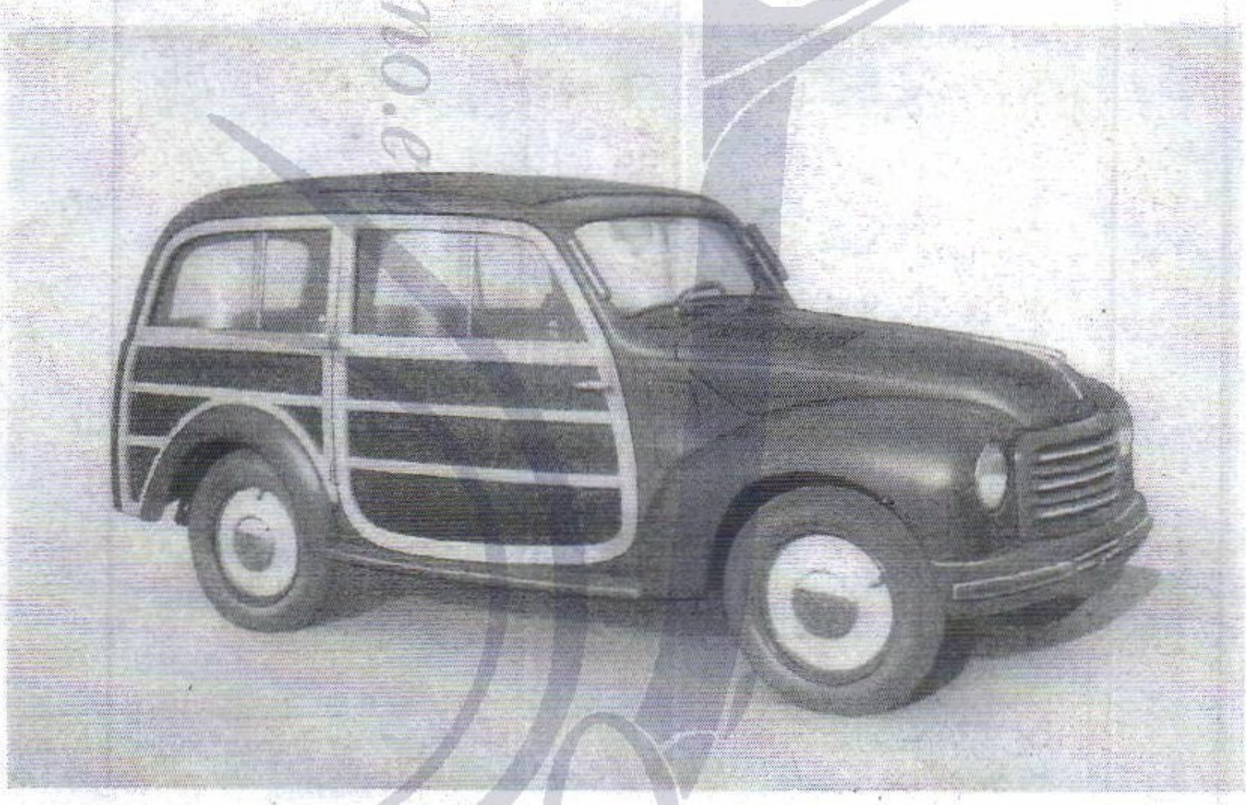


Fig. 63. - **Belvedere Station Wagon, Model 500 C.**

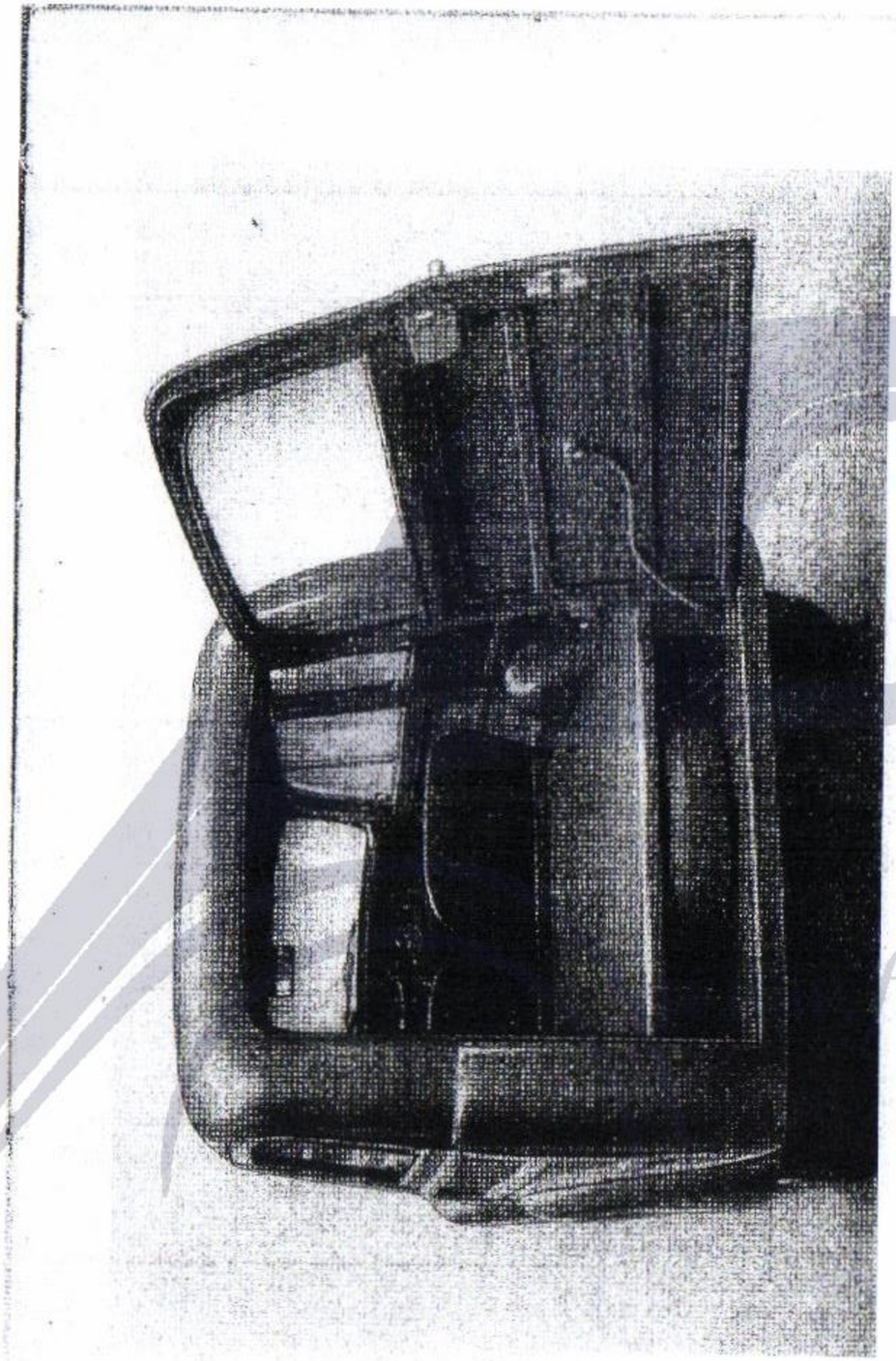


Fig. 64. - Rear view of the **Belvedere Station Wagon**, with opened doors.

DIFFERENCE OF THE DELIVERY VAN AND BELVEDERE STATION WAGON

The differences between either the **Delivery Van** or the **Belvedere Station Wagon** and the standard **Saloon** car, are detailed here. These differences however do not affect the controls and the maintenance, so that the same instructions on these subjects may be caried out as for the standard car.

ENGINE

Brake horse pover . . . . . 15,5 HP

DOWNDRAUGHT CARBURETOR (1)

Solex 22 IAC, fitted with easy starting device and disc valve, controlled by a knob on the instrument board. The knob may be set in three positions: I - rest; II - half way: slightly rich mixture; III - pulled fully out: rich mixture for starting.

The air intake is fitted with an air cleaner of steel wool and with a silencer, both identical with those fitted to the **Saloon** car.

The adjusting data are:

Diameter of choke tube	:	15	mm
» » main jet	:	0,85	»
» » idling jet	:	0,40	»
» » starting jet	:	1,05	»

Cleaning and adjustment.

All the jets are arranged outside the carburetor and are therefore easily reached for a cleaning, to be carried out every 6.000 miles (10.000 km).

(1) On some Delivery Vans and Belvedere Station Wagons, it has been fitted the Weber 22 DRS carburetor, which is standardized on the Saloon car. For its particularities and adjusting data see pages 14 and 55. AS SUPPLIED TO ME.

This opportunity should be seized to clean the interior of the bowl with a chamois leather and to adjust the idling speed.

— The idling speed of the engine can be varied by means of a screw (4, Fig. 65) which limits the closing of the carburetor throttle.

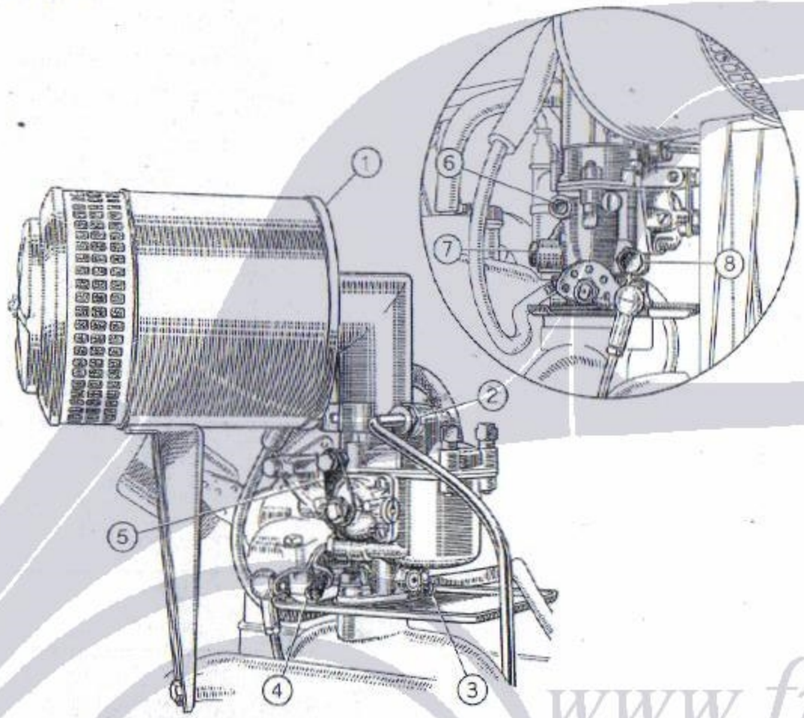


Fig. 65. - Adjusting the Solex carburetor.

1. Air cleaner, with silencer. - 2. Connection for fuel delivery to the carburetor. - 3. Screw for adjusting the air for idling. - 4. Adjusting screw for setting the throttle closing. - 5. Control lever for the starting device. - 6. Jet for idling. - 7. Main jet. - 8. Starting device jet.

— Another screw (3) serves to alter the mixture richness, so that the idling speed will result regular for only a given position of this screw.

— To adjust the idling speed it is first necessary to establish the minimum speed by actuating the screw (4) and leaving screw (3) momentarily unscrewed of about three turns. Then

screw gradually up screw (3) until the engine turns over with regularity.

If during normal operation the engine shows a tendency to stop when the accelerator pedal is realesed, it is advisable to screw up screw (4) so to increase a little the minimum speed, adjusting afterwards in proportion also the mixture richness by means of screw (3).

STARTING THE ENGINE

To start from cold the engine, fitted with Solex carburetor, follow the same proceeding as indicated on page 34.

Yet as soon as the engine grows moderately warm, push halfway the knob that controls the starting device (slightly rich mixture) Push it right down when the engine has fully warmed up.

To start the engine from warm, or during the hot seasons, the starting device knob should be pulled only halfway.

CHASSIS

CHASSIS FRAME

provided with 4 brackets — two on both sides — for offering a suitable spot to the application of the jack.

TRANSMISSION

The reduction bevel gears of the rear axle have a standard ratio of 8 to 41.

REAR SPRINGING

by reinforced semi-elliptic springs.

WHEELS

Low pressure tyres		4,25 - 15 T *
Tyre pressure	front	25 lbs. p. sq. in (1,75 kg/cm²)
	rear	32 lbs. p. sq. in (2,25 kg/cm²)

* The letter appended to the tyre size numbers varies according to the maker.

ELECTRICAL EQUIPMENT

LIGHTING

A tail and braking lamp, equipped with refraction glass, is arranged on the left side of the rear door. Two 3-Watt ball bulbs are provided. To gain access to the bulbs, there must be fully slackned the screw (4, Fig. 66) which cannot be removed,

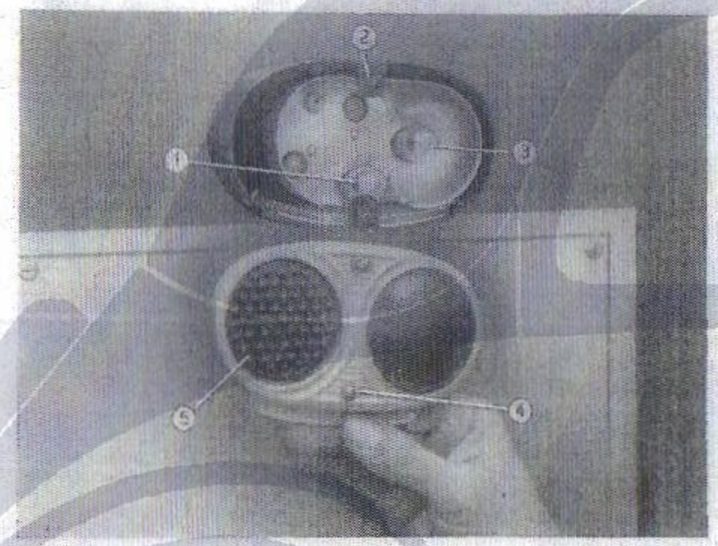


Fig. 66. - Opening the tail and braking lamp.

1. Bulb for number plate lamp. - 2. Bracket for fixing the lamp cover. - 3. Braking light. - 4. Screw that must be loosened for removing the lamp cover. - 5. Refraction glass.

NOTE. — The inner parts of the tail lamp can slightly differ from those of the figure, according to the different makers.

placed between the two glasses, removing then the front portion of the lamp. The bulbs, fitted with bayonet socket, can then be removed.

A ceiling lamp is provided for the interior of the Van, with a globular 3-Watt bulb.

BODY (Delivery Van)

— Metal body with wooden ribs inwardly.

— Two leather-upholstered seats, that can be adjusted for position and have a tilting back.

— Double door at the rear.

— Adjustable driving mirrors, mounted on the two lateral doors.

— Spare wheel arranged in the cab, at the rear, on the other side than the driver's.

BODY (Belvedere Station Wagon)

— Wooden ribbed body. Sides and rear door of wood and masonite.

— Sliding roof of weatherproof fabric.

— Two side windows, fitted both with two glasses, of which the front one is sliding.

— Two adjustable front seats with tilting back.

— Fixed two-place rear seat, with tilting back.

— Single rear door, with fixed glass, for admittance to luggage compartment.

— Driving mirror, with electrical bulb for lighting the interior of the car.

— Spare wheel arranged into a suitable recess under the floor at the rear.

SIZE

Maximum size, without fenders

Length — Delivery Van	132¼" (3360 mm)
» — Belvedere Station Wagon	130¼" (3310 »)
Width — Delivery Van	50¾" (1288 »)
» — Belvedere Station Wagon	50¾" (1288 »)
Height — Delivery Van	54⅛" (1375 »)
» — Belvedere Station Wagon	55¼" (1405 »)

WEIGHTS

Weight of car, in running order, with a spare wheel and tools:
- Delivery Van: abt. 13 cwt (655 kg)
- Belvedere Station Wagon: abt. 13½ cwt (680 kg)

Useful load:
- Delivery Van: 6 cwt (300 kg) *
- Belvedere Station Wagon: 4 seats **

PERFORMANCES

— Maximum speed, in top gear, about 56 m. p. h (90 km/h)

— Maximum climbable gradient, in bottom gear, about . . . . . 1 in 5½ (18 %)

— Gasoline consumption:
over 48½ miles to the Imp. Gallon, that is 40½ miles to the U.S. Gallon (5,8 litres per 100 km).

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* Besides the driver.

** Besides 1 cwt (50 kg) luggage.

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GENERAL MAINTENANCE