

DELAGE

LIGHT SIX 15.7 & 18,2 HP.

TYPE DR.

INSTRUCTION BOOK

Important

The attention of our Clients is drawn on the fact that quicker attention can be given by our Works during winter season and it is therefore in the interest of our clients to have their cars taken to our Works during that season for periodical inspections when it is possible for them to do so.

INSTITUTE





INSTRUCTION BOOK **DESCRIPTION, CARE, RUNNING ADJUSTMENT**

OF THE **DELAUGE 6-CYLINDER CHASSIS**

TYPE D. R. (15,7 HP & 18,2 HP)

INSTITUTE

TÉLÉPHONE :

Wagram 70-96, 87-55, 87-10
Défense 2-50, 5-39
Inter-Wagram 24

ADRESSE TÉLÉGRAPHIQUE :

DELAJAUTO - COURBEVOIE

REGISTRE DU COMMERCE : Seine 42.049

FOR ALL TECHNICAL PARTICULARS, SPARE PARTS AND REPAIRS :

Kindly apply to our Works : **138, Bd de Verdun, COURBEVOIE (Seine)**

Please note

If the engine should after some time show signs of weakness, reference should be made to the hints given on pages 44, 45, 46, 47, 48 on the following items :

Decarbonizing,
Tappet adjustment,
Carburetter cleaning and setting,
Ignition distributor adjustment,
Suction pipings connections.

After these have been seen to, if the engine still does not give its normal efficiency, the valves should be ground in.

Such work will be better done by an expert in a properly equipped garage, because if made improperly it may be absolutely useless.

INDEX

Pages.

General Specification	v
---------------------------------	---

FIRST PART

DESCRIPTION OF CHASSIS

CHAPTER I

ENGINE

1. — General description.	1
2. — Lubrication.	5
3. — Cooling System.	7
4. — Fuel System and Carburation.	9
5. — Ignition and starting.	13

CHAPTER II

DRIVING GEAR

1. — Clutch.	17
2. — Gear Box.	19
3. — Cardan shaft and torque tube.	22
4. — Rear axle.	22

CHAPTER III

FRONT AXLE — STEERING AND FRAME

1. — Front axle	24
2. — Steering	25
3. — Frame and suspension.	26
4. — Driving controls and accessories.	28

CHAPTER IV	
ELECTRICAL EQUIPMENT	Pages 31

CHAPTER V	
BRAKES	33

SECOND PART

DRIVING, ADJUSTMENT & CARE OF THE CAR

CHAPTER I

DRIVING THE CAR

1. — Getting the car ready for the road.	37
2. — Running incidents.	39

CHAPTER II

ADJUSTMENT OF THE CAR

1. — Engine timing.	41
2. — Adjusting carburetter.	47
3. — Ignition setting.	48
4. — Adjusting vacuum servo and brakes.	50
5. — Springing of the car.	51

CHAPTER III

LUBRICATION AND GENERAL CARE.	53
-------------------------------	----

GENERAL SPECIFICATION

Engine.

Nominal horse power (R. A. C. Rating).	15.7 or 18.2 HP.
Bore.	65 or 70 ^{mm}
Stroke.	109 —
Number of cylinders.	6
Car series number : on dash board inside the bonnet.	
Engine series number : on the engine timing-case.	
Track.	4' 4"
Wheelbase.	10' 7"
Wheels, for balloon tyres.	775/145
Weight of complete chassis with one spare wheel.	19 ½ cwt.

Clutch.

Single disc working dry.

Gear Box.

4 speeds and reverse gear, central control.

Rear Axle.

Banjo type. Oscillating spring pads. Central torque tube.

Front Axle.

Reinforced to stand the most severe braking.

Steering Gear.

Screw and nut steering gear. According to requirements, can be adjusted at various angles.

Brakes.

On the four wheels, vacuum servo operated through pedal or direct by hand-lever.

Suspension.

Front and rear straight springs equipped with shock absorbers.

FIRST PART

DESCRIPTION OF CHASSIS

CHAPTER I

ENGINE

I. — GENERAL DESCRIPTION

The **Upper crank case** is built flush with top of frame members and is provided with lugs for fixing the engine to frame. The crank shaft is hung under the upper crank case.

The **Lower crank case** forms the oil sump and carries the oil pump; its lower part is of sufficient area to insure cooling of the oil.

The **Cylinders** of special cast iron are cast in block with ample water circulation between each cylinder. The valves are mounted on the side of the block.

The **Cylinder head** is secured on the cylinder block by means of a sufficient number of screws insuring a perfect tight-

ness. Compression chambers are specially designed to get an efficient mixing of gases and a quick and complete combustion.

The **Crank shaft** is supported on 7 bearings fitted with

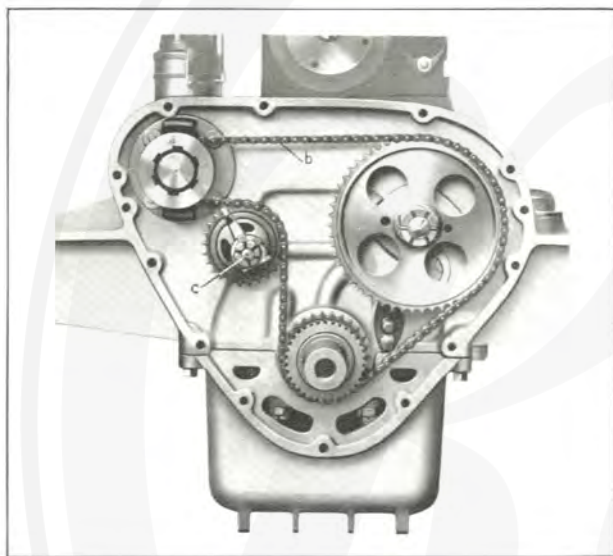


Fig. 1.

babbitted brasses to which oil is fed under pressure by a duct from main lubrication system.

The **Piston** is of the aluminium and cast iron type, constituted by a light aluminium body carrying the rings on which is fixed a light cast iron jacket guiding the piston within the cylinder.

The **Connecting rod** is a steel drop forging and babbitt is cast into the head without use of brasses.

The **Gudgeon pin** is hollow and of ample diameter; it

rotates freely in the small end of connecting rod and is a tight-fit in the piston.

The **Valve gear** (fig. 1) is operated by a noiseless chain (b) provided with a special stretcher (c), adjustable from outside. Forced lubrication is provided for the chain tightener.

An oil sprayer ensures a noiseless run and a long life of the chain.

The camshaft is supported in the crank case on 7 bearings, pressure lubricated.

This camshaft controls the valves, laterally disposed in the cylinder, by means of flat plungers. A spring returns the valve on its seat.

DISPOSITION OF ENGINE COMPONENTS AND EQUIPMENT

Intake is from left hand side of cylinders. The **inlet manifold** is cast aluminium and that of exhaust is cast iron; this latter has a central contact with inlet manifold.

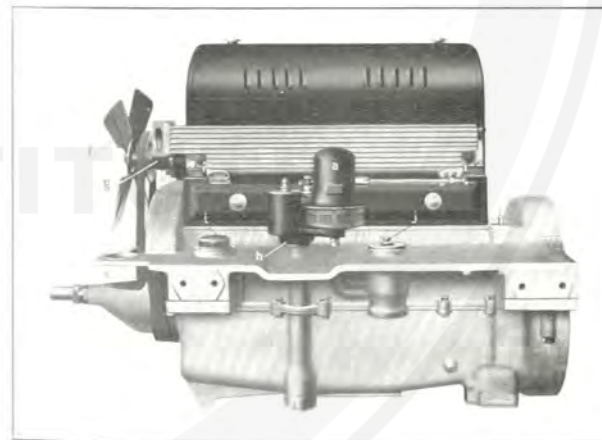


Fig. 2.

The **Carburettor** (a) (fig. 2) is fixed direct to conduit by means of a flange.

The **Dynamo** is fitted on a base on the right hand side behind the ignition distributor.

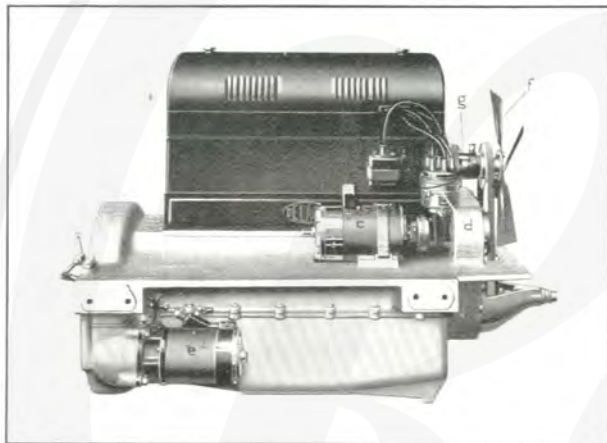


Fig. 3.

The **Starter** (fig. 3) (e) drives the engine flywheel through an "eclipse" pinion. It is fixed to crank case (See specification of starter, chapter "Ignition and starting").

The **fan** (f) (fig. 2) is belt operated and its support (g) is fixed to cylinder and built as body of the water pump.

The **oil drain** combined with the **oil gauge** is found at left side of crank case.

Oil is filled (i) (fig. 2) by means of a large cap on the same side where are also the **oil strainer** (j) and the **pressure regulating valve**, thus the whole of devices for lubricating the engine are located on the same side of the crank-case.

II. — LUBRICATION

The engine is lubricated by means of a gear pump (fig. 4) operated by a helical gearing on the camshaft.

The pump is fixed to lowest part of the sump. Oil is forced in a conduit of large diameter cast into the crank case, and shape according to diagram illustration N° 1.

We notice that the oil delivered by the pump :

1. — Passes through a strainer before its use,
2. — A release valve of ample section regulates the pressure within the main piping.

3. — A duct to the pressure gauge is provided on the main piping, past the strainer.

4. — The main pipe feeds the oil :

a) To 7 bearings of crankshaft feeding automatically the connecting rods through oil ways bored through the crankshaft arms and pins,

b) To valve gear and chain tightener,

c) To 4 bearings of camshaft.

All oiling holes of these various parts are carefully calibrated to have a known and constant flow.

The design of the pump is such that in normal conditions of wear of the bearings the pressure of warm oil will not fall below 7 lbs. per sq. inch. at a speed of about 45 m. p. h. of the car.



Fig. 4.

The main parts of the lubricating system are accessible as follows :

1. — **The pump**, by unscrewing the castellated nuts as shown in fig. 4. The pump may be taken out, pulling it down-

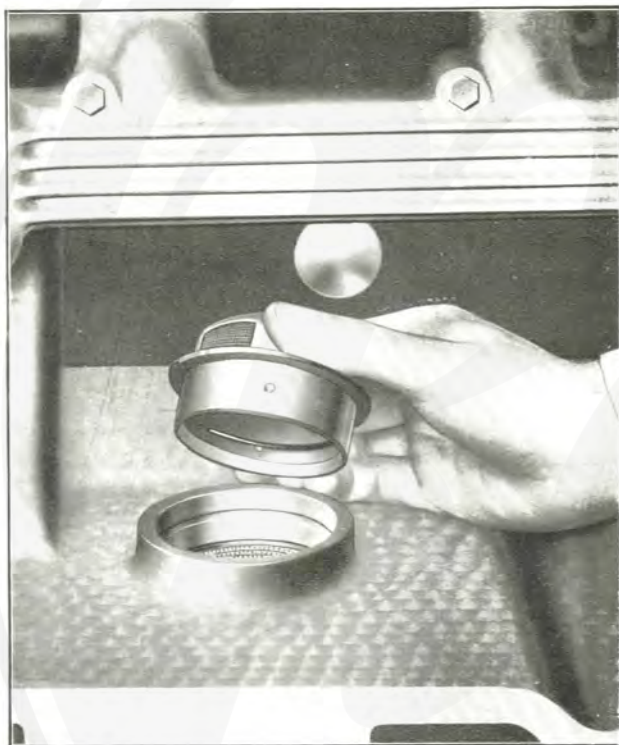


Fig. 5.

wards. Take care not to damage the gasket when assembling and make sure of the correct position of the tongue relative to mortise of driving shaft. Do not forget to pin the nuts.

2. — **The filling cap** is not threaded; pull it vertically out of its seat. When replacing the cap, push it in tight to

have the retaining spring duly returned into its recess (see fig. 5).

3. — **Draining and gauge** : The flexible gauge is drawn out vertically. It is kept in place by means of an expansible part (fig. 6).

To drain the sump, turn the handle towards the corresponding mark on the plate, viz :

F — (Fermé) Closed, for running the engine.

V — (Vidange) for draining.

4. — **Oil pressure valve** : May be dismantled by unscrewing the plug and pulling the valve out vertically by hand (fig. 7). Do not forget to re-fit the spring.

5. — To remove the **strainer**, unscrew the central nut and pull out by hand the part supporting the strainer (fig. 8).

For general care of the engine, relative to lubrication, see this manual (page 50).

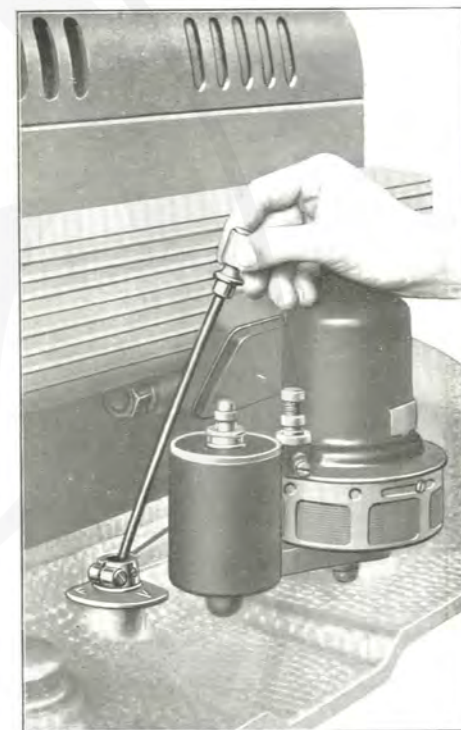


Fig. 6.

III. — COOLING (fig. 7).

The engine is water cooled by means of a centrifugal pump (9) (fig. 2) located at front within the cylinder and in line with the fan.

The pump is provided with a packing gland and lubricated by means of a special leakproof tecalet greaser.

Water is sucked at lower part of the radiator through a cast pipe connected to pump by means of a rubber joint.

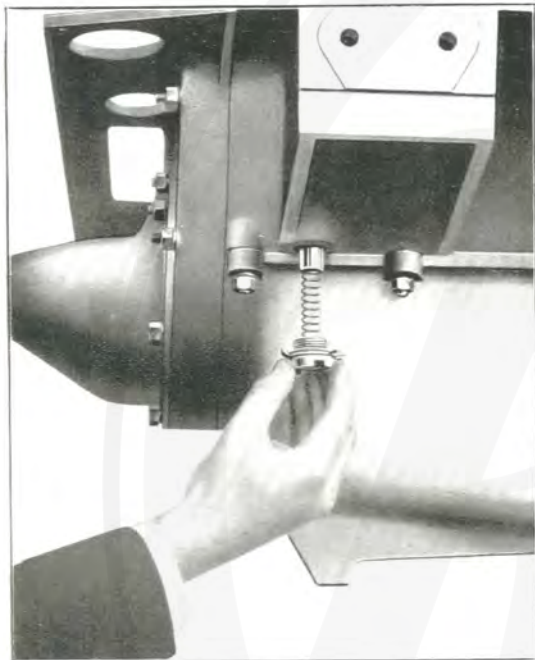


Fig. 7.

The radiator is fixed to the frame by means of two ball sockets and to dash board by means of a robust tie-rod at its upper part.

Water is forced into the cylinder block through a pipe delivering it at centre of block, passes into the cylinder head and comes back to radiator through a pipe located at front of cylinder head.

Radiator is of

“ dummy ” honey comb vertical water seam type.

A special device prevents water from flowing through overflow pipe in case of sharp braking.

REMOVING RADIATOR :

Take down the headlights, drain the radiator, by operating the special cock located on the lower part of the radiator, disconnect the pipe, remove the bracket caps, dismantle the tie-rod and the water inlet pipe, the radiator may be then lifted vertically.

To replace the radiator make the above operations in the reverse order. Take care to have the gasket carefully in place when assembling the pipe.

REMOVING PUMP :

To remove pump :

1. — Drain the radiator.
2. — Remove the radiator.
3. — Remove the fan blades.
4. — Unscrew the nut at shaft end.
5. — Unscrew the four nuts fixing the support.

Remove the fan pulley and its key, then the pump assembly pulling forward, the shaft remains in place and the packing gland is accessible.

Removal of pump is necessary only for inspecting the pump and renewing the packing gland. Apertures are provided in the main support to easily insert a “ C ” spanner to adjust the gland.



Fig. 8.

IV. FUEL SYSTEM AND CARBURATION

Petrol from rear tank is sucked by a vacuum feeder located on the dash board in a 4 1/2 litre tank (approx. 1 gallon.)

To shut off the petrol supply a cock is provided.

The carburetter (illustration N° 2) is of **Delage** make, **Smith** license. This carburetter comprises the usual type float-chamber with a strainer (B) and a needle valve located at its lower part.

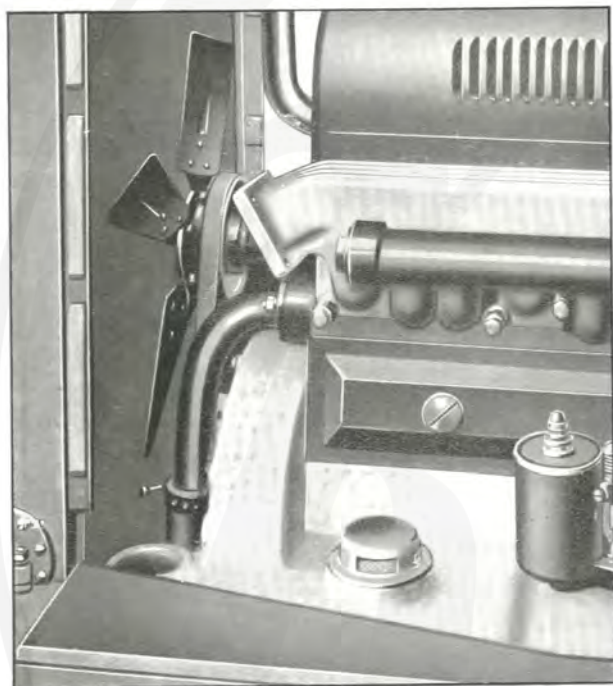


Fig. 9.

From the float chamber, petrol flows into the carburetter itself (C) through different passages (D), leading to 4 vertical jets and 1 slow running jet, all of the same height, their upper end terminating at level of fuel in the float chamber. We shall call the part supporting the float chamber and jets the "jet-carriè" (E).

Each of the 4 main jets projects into the body of carburetter through an oblique tubular channel, bored out in the body, one end of which opens outside for air suction, the other

one terminating on the cylindrical wall of the body. Each of said holes is numbered from 1 to 4, beginning from the lowest one. A bell shaped cap (F) slides with a slight friction on this cylindrical part and is correctly guided by means of a central rod (G).

The under face of the bell communicates with atmosphere by means of a small pin hole (H) in the highest port.

The whole assembly is enclosed in a casing (K) on which are fixed the inlet pipe to cylinder and the throttle butterfly valve (L).

A mixture regulating ring (M) provided with a tongue which when rotated allows :

1. — To shut off holes N° 1 & 2 for an easier starting.
2. — To disclose them, for normal running.
3. — To disclose gradually a series of holes for extra air admission into each of ports N° 2, 3, 4 for running with weak mixture, thus saving petrol under specially favourable conditions.

The slow running carburetter opens at the edge of the butterfly valve and is provided with a secondary adjustable air valve (N).

The jet carrier is secured on the body by means of a single binding nut (O) for an easy removal.

OPERATION :

The operation is as follows :

1. — **Starting** : The bell is in its lowest position and blocks up the holes N° 2, 3, and 4, hole N° 1 being disclosed; the correcting ring is at "starting" position, i. e. blocking up holes N° 1 et 2. The throttle is slightly opened in order to set up an enormous suction on the slow running jet.

By operating the starter, the engine fed by the slow running jet starts up.

Whence the engine starts firing, keep the foot on accelerator pedal for a few seconds until even acceleration may be given, then bring back "mixture control" to the position of "normal".

2. — **Accelerating the engine** : When opening the

throttle valve and what the speed of the engine may be when opening it, hole N° 1 alone is in action. Its relatively small diameter gives the gases a sufficient speed to suck in petrol and supply a good mixture.

When speed of engine is accelerated, the output of jet N° 1 becomes too small, the suction around the bell increases and same is progressively lifted, disclosing gradually all the holes.

3. **Picking up :** When the throttle-valve is shut off, suddenly, either completely or throttling down the gas, vacuum decreases round the bell which comes to its lowest position or to an intermediate position according to value of vacuum. When throttle valve is again opened, bell is again lifted up, feeding the engine through a section at first small but increasing gradually.

Thus, what the pedal operation of the driver may be there is no risk of choking up or popping back as usually happens when unskillfully accelerating.

On the other hand, inasmuch as the engine runs always with a nozzle the diameter of which is adapted to the relative speed, fuel consumption is of highest uniformity, fact independent from use of the car, either for town service at an average speed of 13 m. p. h. or for tourism at an average speed of 44 m. p. h.

DISMANTLING CARBURETTER :

It may be necessary :

1° — **To remove carburetter from engine,** to this end shut off petrol tap, disconnect piping, disconnect controls of throttle valve and starting vent. Take out the four nuts of set flange on cylinder and the carburetter may be removed, pulling it outwards. There is no reason to dismantle carburetter on the road. The jet carrier and petrol strainer only need be removed for cleaning purposes.

2° — **To remove jet carrier,** shut off petrol tap, disconnect petrol feed pipe to carburetter, take out lower nut, the jet carrier goes down vertically.

3° — **To remove petrol strainer,** shut off petrol tap, disconnect petrol feed pipe to carburetter and hook out the strainer by means of a small piece of wire.

Notice : Figures stamped on jets do not show diameter of hole but their output in cubic centimetres per minute.

V. — IGNITION & STARTING

Ignition is provided by means of a battery and a distributor.



Fig. 10.

The description of such devices is given in the special pamphlet published by the NORTH-EAST Co and annexed to this general specification.

Switching off ignition is controlled by a key (a) on the switchbox of dashboard (fig. 10).

Ignition wires are located under the cylinder head cover and are protected by an insulating outer cover. Each wire bears its corresponding cylinder number at ends.

The starter drives the flywheel through a toothed ring.

DELAGÉ SPARK PLUGS

"STANDARD" TYPE



Outer view.



Section.

"SPORT" TYPE



Outer view.



Section.

This device is provided with an "eclipse" arrangement, i. e. pinion engages the toothed wheel in the same manner as the striker of a gear box, before the starter rotates it.

The small pinion is free-wheel mounted on its shaft thus, when engine is started and flywheel is driving pinion, the free-wheel slides and the pinion teeth are not submitted to any abnormal stress. This results in a noiseless run, no wear of teeth being caused.

DELAGÉ SPARK PLUGS

We strongly recommend to our customers to use for our high efficient engines only perfectly suitable spark plugs.

In order they may spare expensive tests always detrimental to a durable good run of the engine, we designed two models of spark plugs, the "Series" and "Sport" types giving entire satisfaction in every condition of use of our cars.

They can be easily differentiated, as the "Sport" type is provided with brass cooling fins at top, which are not found on the normal type. Moreover they are marked on the body.

For both types, only first class materials are used; they are manufactured according to our well known usual construction cares, the parts being submitted to the most severe inspection.

The common features of these spark plugs are as follows :

The central electrode consists in a stem, the part exposed to spark is made of metal resisting to highest temperatures without oxydation.

The shank of the electrode sunk into the insulator is of high conductivity and its big diameter insures a rapid dissipation of heat.

The insulation material used is a special vitreous product, highly homogeneous, of very fine grain, which is in no case permeated by gases in hot state.

The electrode is screwed into the insulator and joint between both parts is made of special cement, carefully dried and

baked at very high temperature. Insulator is set mounted on the spark plug cap. Two copper and asbestos joints insure a perfect tightness and their flexibility prevents insulator from breaking.

For the " Sport " type, porcelain is very efficiently cooled due to its position close the body; the point of central electrode being also shorter than in the " Series " type, allowing nevertheless a sufficient ignition of gas at low speed, is less exposed to heat. The rapid heat dissipation is further increased by a small ring provided with cooling fins at top end of electrode.

All our spark plugs are pressure tested for tightness, then submitted to electrical tests :

1° — On a gauge to determine electric resistance of insulating part;

2° — Operating the spark plug in a gaseous medium at a pressure above normal operating pressure.

CARE OF SPARK PLUGS :

It is recommended to check adjustment of spark plug and clean them every 3.000 milles.

To this end, carefully clean porcelain and body with petrol, then adjust gap with end of a screw driver, acting upon the small electrode, gap must amount to 0.4 mm.

REPLACING SPARK PLUGS :

We recommend, even if the engine seems to run normally, to replace the spark plug set every year or every 25.000 km.; efficiency of engine as well as its operation at slow speed will be thus entirely satisfactory.

All our agents have a stock of " Sport " and " Series " **Delage** spark plugs, furthermore our **Courbevoie** works are in position to make immediate deliveries.

CHAPTER II

DRIVING GEAR

I. — CLUTCH (fig. 11 et 12).

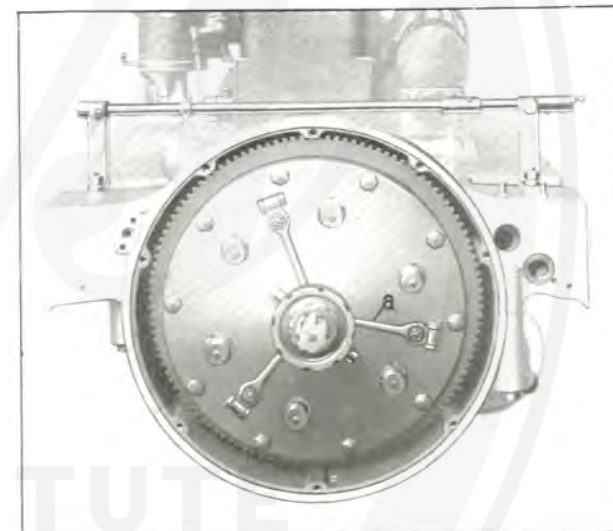


Fig. 11.

Clutch is of single special steel disc type, dry operating, of very important reduction ratio and though springs are of ample dimensions, stress on pedal is very smooth. A special thrust ball-bearing absorbs reaction of pedal stress when disengaging clutch.

This ball bearing is fixed on a clutch sleeve sliding within a disc bolted on flywheel. When sliding the sleeve drives three levers resting on the disc and pulling a steel disc provided with teeth enga-

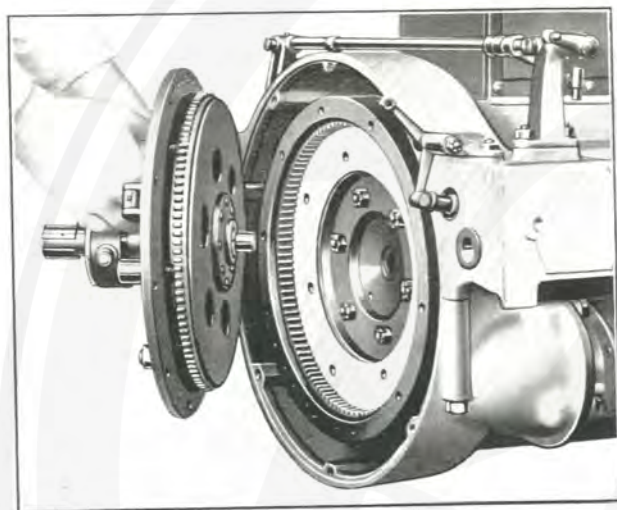


Fig. 12.

ging with a smooth friction into corresponding teeth of flywheel. Both this steel disc and the inner face of flywheel are lined with a friction non-wearable and incombustible product; the pressure of the clutch springs being applied on the toothed steel disc, thus pressing the special steel disc between the two linings and driving the car through the central shaft to the gear box.

An inspection cover, easily removable, gives access to clutch either to remove a spring or to oil the thrust bearing and its control.

To remove clutch, take down the gear box (see removal of gear box, page 19), remove spring caps and screws fixing the disc on flywheel.

The assembly comprising sleeve, levers, disc and coupling disc, may be pulled out (fig. 12).

Afterwards, the special steel disc may be easily removed.

When assembling, take care to replace disc at correct position opposite the mark on the flywheel.

When clutch is assembled, all parts being in position of beginning of declutching, it is necessary to have a play of about 9 mm. behind the lever. Take care too the three ball-nuts bears evenly.

II. — GEAR BOX (fig. 13).

Gear box is of usual type with double sliding gear giving four speeds (the 4th being "direct") and a reverse.

Shafts of ample size are supported on large bearings giving a great rigidity to the unit.

Teeth of wheels are ground to shape for a noiseless operation at all speeds.

The sliding gears are operated by means of selecting forks driven by a ball lever. A lug stops the fork in correct position for each speed and a locking device prevents simultaneous engagement of two speeds.

The speedometer is driven at rear of sliding shaft by means of a worm gear (a) (fig. 13).

An oil filling cap is provided at (b) (fig. 13).

An oil drain plug is provided at (c) (fig. 15).

An oil level plug at (d) (fig. 13).

Hand gear change lever (e) is mounted in center of gear box.

Brake handlever (f) (fig. 13) is at right side of gear change lever when steering is at left, and at left when steering is at right side.

Gear casing supports the pedal assembly (g) and the Dewandre vacuum brake (h) (fig. 14) fully described chapter V, page 33.

TO REMOVE GEAR BOX :

- 1^o — Draw back rear axle (see page 22) and wedge chassis.
- 2^o — Disconnect at one of their ends, both brake cables

3° — Remove hand brake connecting rod, protecting plates, accelerator pedal, tubes of vacuum brake, flexible connection of speedometer, rear exhaust pipe, floor boards (except 1st board).

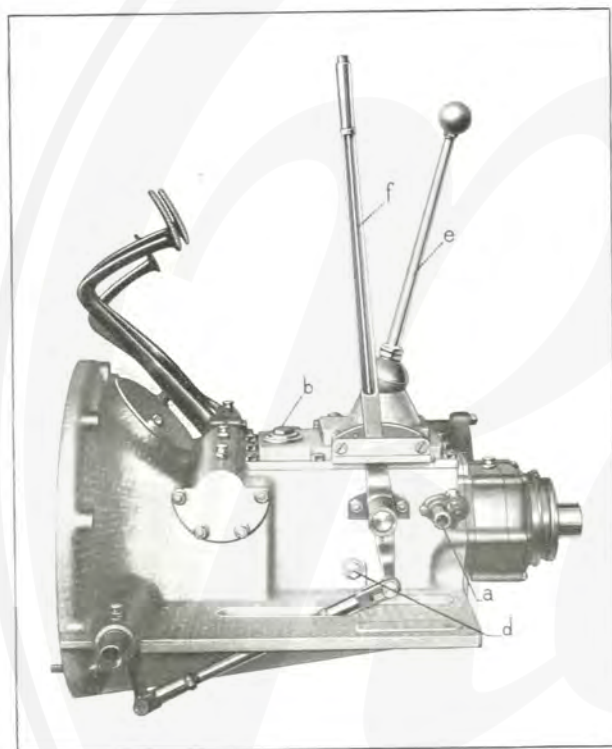


Fig. 13.

4° — Take out, through inspection cover, the bolt which passes through main shaft, on the gear-box side.

5° — Remove screws fixing gear box to engine (except upper one).

6° — Suspend or maintain gear box by means of wedges laid on the ground. Take out last screw.

7° — Draw out by pulling the clutch pedal. Remove

carefully gear box horizontally, upholding clutch shaft near engine if necessary.

8° — Pass gear box under chassis.

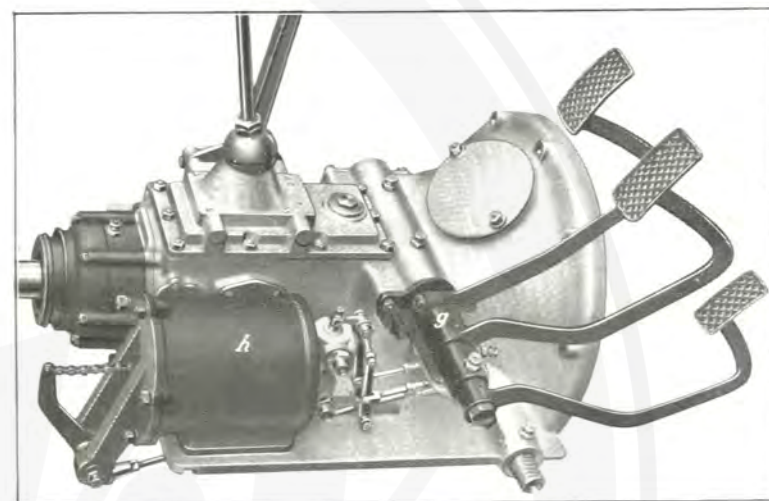


Fig. 11.

TO REPLACE GEAR BOX ON CHASSIS :

Make the above operations but in reverse order, and take care that :

a) Gear box to be wedged at engine height, corresponding faces carefully parallel and one speed engaged for an easier setting right of grooves.

b) Assembly will be made in the following order :

1. Fork mounted on thrust box pins.
2. Finger of upper clutch lever into fork of lower lever.
3. Clutch shaft into gear box driving shaft.
- c) Stretch carefully the cables, and straighten them.
- d) Oil every part exposed to friction.

III. — CARDAN SHAFT & TORQUE TUBE

Motion is transmitted from gear box to back axle by means of a shaft guided within a torque tube fixed to back axle. This shaft is cardan coupled to gear box and drives the gear driving in turn back axle by means of a 6 spline-sleeve.

The cardan shaft is further supported in its central part by a flexible roller-bearing to prevent any vibration.

Tube enclosing cardan shaft transmit the impulse of wheels. To this end it is anchored to the gear box by means of a ball-joint to allow oscillations into every position; rear part of gear box is provided with 2 half-shells enclosing the ball.

The torque tube is thus intended for 3 purposes :

1. To transmit impulse.
2. To support central roller bearing.
3. To absorb all torque reactions.

IV. — REAR AXLE

Rear axle is of banjo type with swinging spring blocks differential shafts being supported by a single ball bearing.

Gearing of rear axle is wholly supported by an annealed cast steel casing closed at rear by a pressed steel cover provided with a groove for an efficient lubrication of bevel gears.

Crown may be adjusted after removal of rear cover.

To adjust meshing-in of gears, take out small cover located on torque tube.

On rear hubs are mounted cast iron lined steel brake drums, provided with fins for stiffness and better cooling.

Stresses developped within the rear axle gearing by the bevel gear are absorbed by ample ball bearings and ball thrust bearings.

DISMANTLING REAR AXLE

1. — Disconnect brake cables and shock absorbers, remove exhaust pipe.

2. — Remove rear spring shackle-bolts.
3. — Lift back of chassis to suitable height and remove rear axle.

RE-ASSEMBLING REAR AXLE :

Proceed in the reverse order, taking care :

1. — To place wheels preferably on skates to avoid rotation of cardan shaft when the axle is moved forward.
2. — That spring center bolt heads are correctly located into their housing under rear axle, before screwing home the spring clip nuts.

CHAPTER III

FRONT AXLE -- STEERING -- FRAME**I. — FRONT AXLE**

Front axle consists in a stout drop forged body, with inclined stub axle supporting wheels and mounted on swivel pins revolving in bronze bushings.

Swivels are coupled together by two connecting arms and cross-bar with shock absorbing ball joints.

Motion from the steering is also transmitted through a lever on swivel and bar with shock absorbing ball joint.

The stub axles carry the front brake flanges (see description of brake controls, chapter V, page 35).

The axle body extends into two pads supporting the springs.

TO REMOVE FRONT AXLE :

1. — Disconnect steering bar and brake cables.
2. — Free front brake controls from radiator brackets.
3. — Unscrew nuts of 8 bolts securing the springs to front axle.
4. — Lift up front part of chassis by means of hoisting tackle and remove axle.

TO REFIT FRONT AXLE :

Proceed in reverse order, taking care :

1. — To correctly locate fastening bolt heads into their holes,

2. — Assemble strictly in same order and in same position parts of steering bar.
3. — Oil end of steering bar.

II. — STEERING

Steering is of the worm and nut type with oscillating pillar. With such arrangement all joints are provided with ample bearing surfaces, wear being thus reduced to a minimum.

The steering nut consists in a babbitted hard bronze body. It controls the steering lever shaft by means of a forked rod provided with two case hardened rollers.

Steering screw, trapezoidal threaded, is brazed on a pillar provided with a double thrust ball bearing compensating stresses.

Steering pillar and screw are hollowed to give way to ignition control rod operated from center of steering wheel also to electric horn control.

Steering lever is linked to swivel by means of a ball joint connecting rod provided with shock absorbing springs.

Steering assembly is mounted on 2 bearings to adjust angle of rake at will.

An adjustable support fixed to instrument board imparts to steering assembly the necessary rigidity.

TO DISMANTLE STEERING :

1. — Disconnect steering rod from lever located at lower part (notice order and position of parts).
2. — Remove bonnet running board (fixed by means of countersunk screws to frame).
3. — Remove ignition handle cover on steering wheel (take care of peg and its spring), ignition handle, nut securing wheel, and steering wheel.
4. — Remove bearing caps. Hold fast steering assembly

and disengage its fastening collar (at upper end of post), free it from support.

5. — Remove steering assembly towards the engine, ignition control being disengaged.

TO RE-ASSEMBLE STEERING :

Proceed in the reverse order, taking care :

1. — To assemble parts of end of steering bar strictly in the regular order and position and fill with grease.
2. — Do not strip off insulation of both electrical wires, do not grip them.
3. — Pull up fully the ignition control rod before fitting the hand lever on end of same.

III. — FRAME & SUSPENSION

Pressed steel frame, side members being of ample section. A sturdy X cross member (a) (fig. 16) is mounted at centre of frame ensuring perfect rigidity.

Further, the frame supports the following parts :

The **Engine**, bolted on brackets fastened on side-members

The **Radiator**, fixed to two swinging brackets, supporting also the front brake controls.

The **Battery** (a) (fig. 15), located in a steel sheeting case secured to one side and one cross member.

The **Silencer** (b) hung by two steel sheeting brackets bolted to frame.

The **Rear petrol tank** (d) fixed to frame, by two points on rear cross member of frame, and one on cross bar.

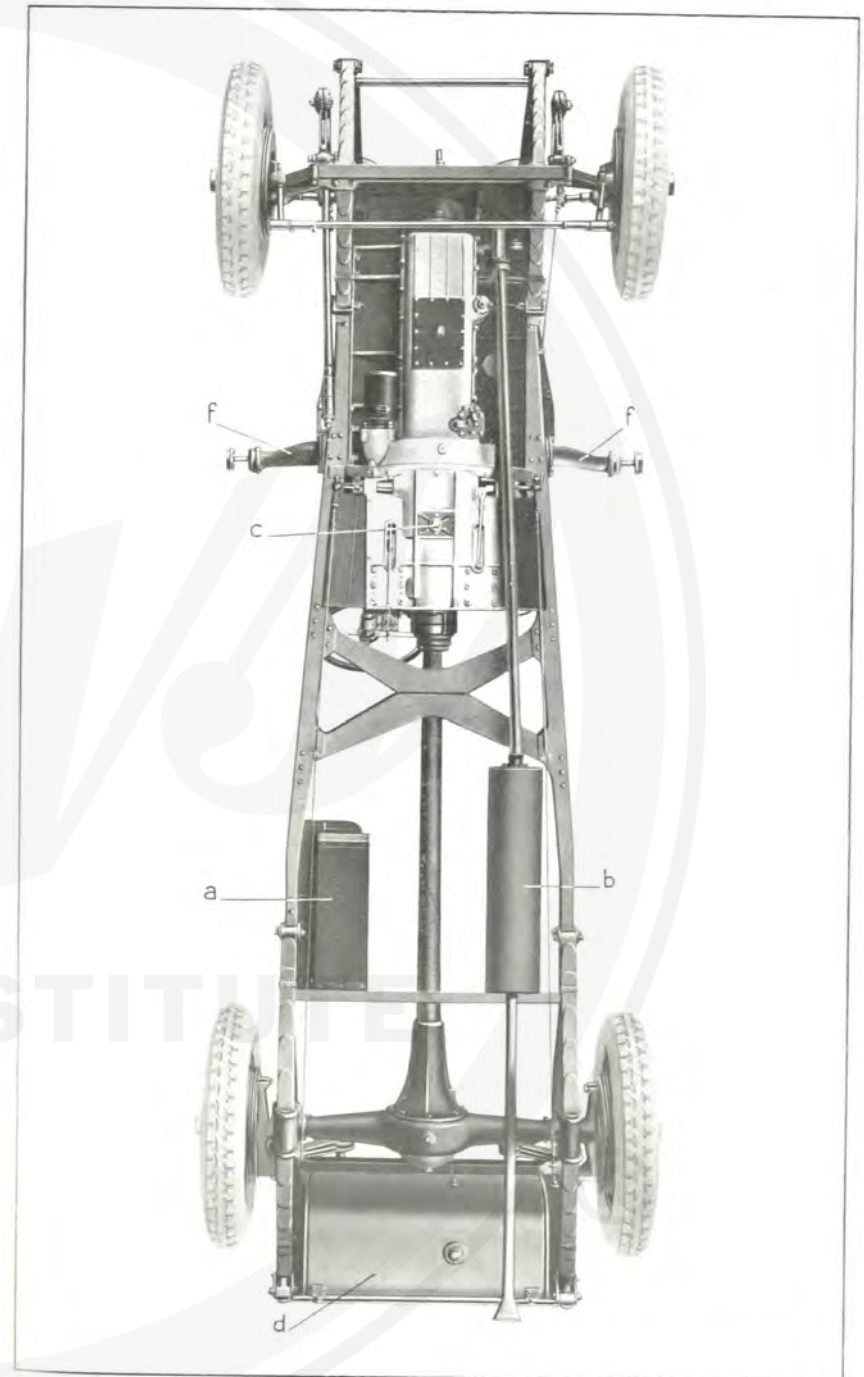


Fig. 15.

The **Dashboard**, bolted direct to frame.

The pressed steel **spare wheel carrier** (/).

FRONT SUSPENSION :

Front springs are fixed to frame by means of rear bracket and at front by means of a double shackle.

Hartford shock absorbers are located outside the frame.

REAR SUSPENSION :

Rear springs are fixed to chassis frame by means of double shackles at both ends.

IV. — DRIVING CONTROLS AND ACCESSORIES

Foot driving controls (fig. 16) :

1. — Brake pedal (*b*).
2. — Clutch pedal (*c*).
3. — Accelerator pedal (*d*).

Said three pedals are located always in the same position as regards the steering post, whether this is for R. H. or L. H. drive.

4. — Starting pedal (*e*) bolted on the floor board in the center of chassis.

Hand controls (fig. 16).

Steering wheel of large diameter, flexible type.

Ignition control handle (*g*) on steering wheel.

Mixture control lever (*f*) (fig. 10) on instrument board.

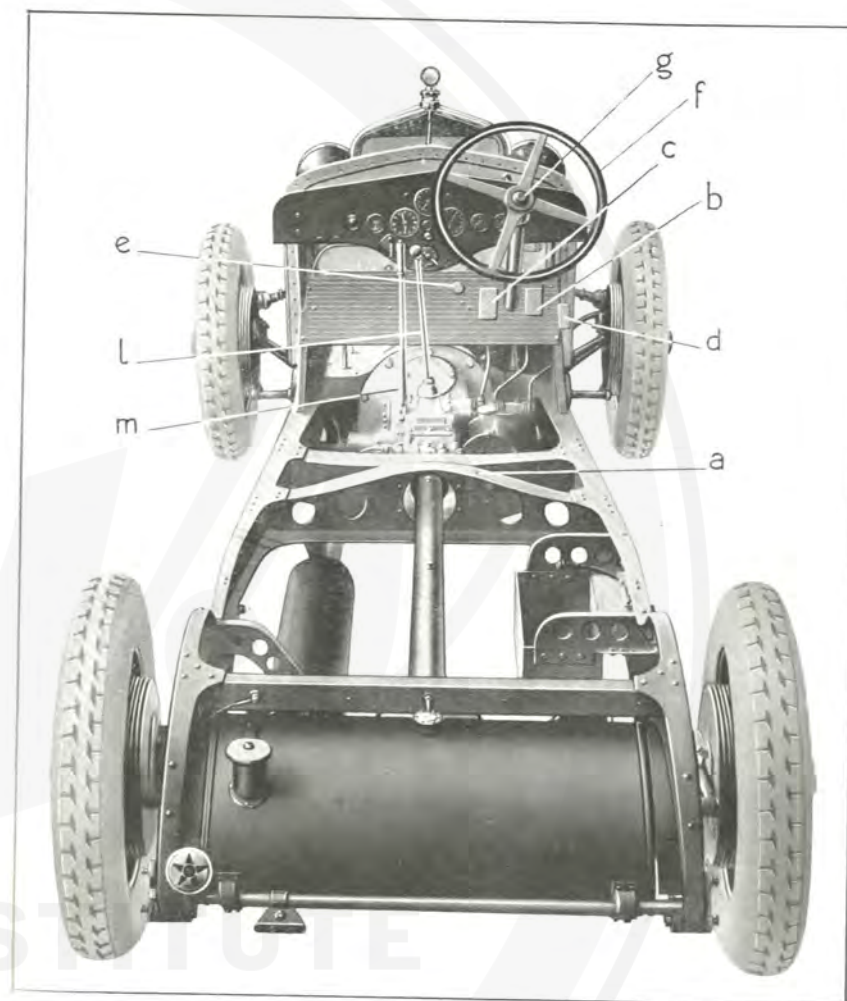


Fig. 16.

Gear change lever (*l*) (fig. 16).

Brake hand lever (*m*).

are mounted on gear box, both in center of gear box, brake lever is on the off side when steering is at left and on the near side, when steering is at right.

Control instruments :

A clock (*o*) (fig. 10);

A speed indicator with trip and total recorder (*p*);

A "Nivex" petrol gauge (*q*);

An ammeter (*r*);

An oil pressure gauge (*s*);

A dashboard lamp with socket for portable lamp (*l*);

A switch box with key (*k*).

The above devices are grouped at centre of dashboard and may be lighted by a non dazzling reflector.

CHAPTER IV

ELECTRICAL EQUIPMENT

See special notice "Lighting and ignition" of the North East Co. relative to electrical equipment of the car.

GENERAL SWITCH (fig. 17 et 18).

A general switch is placed on the right side member of the chassis, close to the battery.

On a complete car, the handle of this switch does appear through the side valances in the angle formed by the right rear wing and the running board.

This switch allows by a single rotation of only a quarter of a turn, to cut the current from the battery, it means cutting all circuits, either lighting, starting or any other accessory.

This new apparatus has amongst many advantages the following :



Fig 17.

1° It constitutes an extra safety against theft, besides

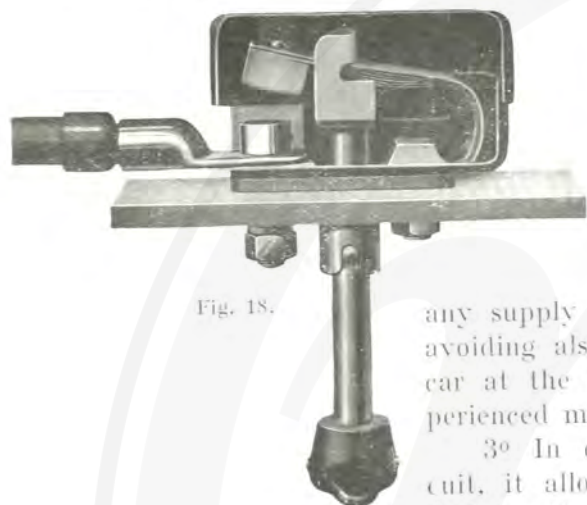


Fig. 18.

that given by the switch key on the dash board.

2° During a long period when car is left unused, it cuts off absolutely

any supply from the battery avoiding also starting of the car at the garage by unexperienced mechanics.

3° In case of short circuit, it allows to cut immediately all current, to locate

the short circuit and to remedy to same, thus saving any risk of fire.

CHAPTER V

BRAKES

Brakes act upon all 4 wheels; they are pedal controlled by means of "servo" or hand controlled by means of a hand lever located near the gear change lever.

Illustration (n° 3) shows a diagram of **Dewandre's** type vacuum brake.

It consists in a vacuum cylinder (A) into which is operated a piston (B) tight adjusted by means of a leather lining and repelled to its resting position by a coiled spring (Z).

Cylinder may be connected to engine inlet piping or with atmosphere by a distributor consisting in two concentric valves (C) and (D) kept closed by a spring (E). Vacuum valve (C) is opened by pulling central rod, air valve (D), by depressing the annular rod. Both operations cannot be simultaneous and are realized by means of a crank lever (F) which at rest keeps air valve opened under the action of return spring of pedal (K). This lever is provided with a fork, engaging end of a lever (G) keyed to spindle (H). This spindle acts as pivot pin (H) for a second lever (I) rotating at other end on a fixed spindle (J) secured to the cylinder (A).

Each of lever (I) and (G) is operated by a connecting rod linked : for (G) on lower extension of brake pedal (K) and for (I) on lever (M) keyed to shaft (XX) on which pedal (K) revolves freely. (XX) controls the cross-shaft (YY) by means of toothed sectors (W).

Cross shaft (YY) is provided at each end with a double

lever (P) and (S) of which the upper ends control front brake cable and the lower ends the rear brake cable.

When at rest, the brake controls leans through lever (M) of shaft (XX) upon an adjustable butt screw. Lever (M) is ended by a finger (T) (diameter 12) moving within the eyelet (U) (diameter 16) of pedal (K) (4 mm. play) and acting as pivot for a so called "reaction lever" (L) receiving piston impulse through chain (Q) lever (P) and rod (O).

Operation is as follows :

When depressing pedal (K), (M) resting upon (V) is not moved, the 4 mm. play decreases, connecting rod acts upon lever (G) which by means of a square countershaft (F) shuts air valve (D) then opens vacuum valve (C).

Under action of vacuum, piston (B) is displaced and draws reaction lever (L). The latter resting upon pedal (K) through butt (N) (which re-acts proportionally on foot) operates the brakes by means of lever (M) and its finger (T). Displacement of lever (M) further turns lever (I) on its fixed pivot and accordingly returns square countershaft into its previous position i. e. closing thus vacuum valve. Foot pressure on the pedal and reaction of the brakes are then balanced.

If pedal is again depressed with an effort greater than reaction felt at foot, the same operation will be repeated and brakes will be applied more strongly.

It is obvious that braking is progressive and gives always to foot a reaction proportionnal to braking efficiency.

If pedal (K) is released, its return spring, aided by the reaction will return it and operation of connecting rods and levers in reverse order to previous one, will close vacuum valve and open air valve.

Under the action of its spring, and of brake-shoe springs, piston is drawn back and parts resume their position; brakes are released.

In case of non operation of vacuum brake (if the engine would stop for instance) cross-shaft (YY) is direct operated by pedal (K) as soon as its eyelet bears against finger (T)

of lever (M); chain (Q) slackens down, thus there is no stress upon piston (B).

FRONT BRAKES :

Front brake is constructed as follows :

The brake itself consists in 2 inner shoes, each linked on

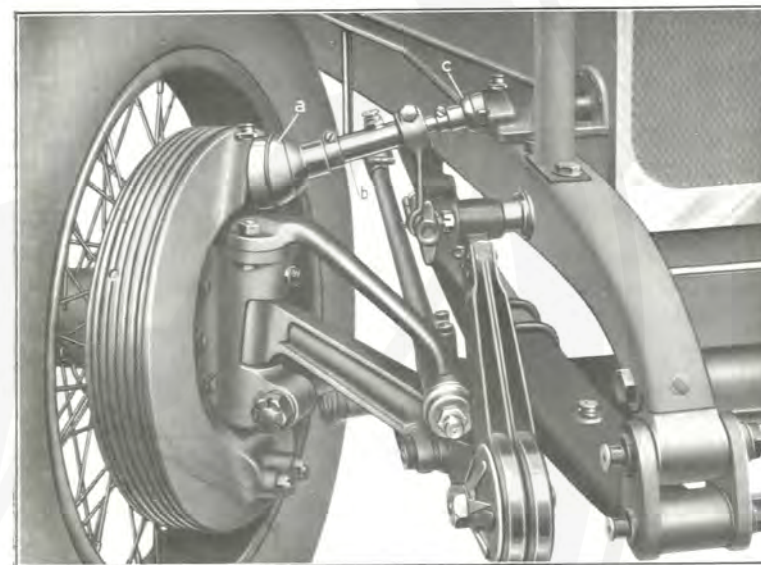


Fig. 19.

a pivot and operated by a cam specially designed to get an even pressure and wear on both shoes.

The cam is provided with a universal joint (a) (fig. 19) operated by the telescopic fork (b) supported at its end by means of a ball joint (c) on radiator bracket.

All above couplings are made water and dust tight by suitable gaiters.

Brake levers are returned into neutral position by means of springs independent from shoe springs.

REAR BRAKES :

The same description applies to rear brakes except that the cams are rigid instead of being fitted with universal joints.

BRAKE DRUMS :

The four brake drums are alike and made of steel with ribs all round thus ensuring a perfect rigidity as well as perfect cooling.

This drum is lined with a cast iron skirt giving following advantages :

- 1° Complete silence when braking.
- 2° No wear;
- 3° Best coefficient of friction with the brake lining used.

SECOND PART

DRIVING, ADJUSTMENT & CARE OF THE CAR

CHAPTER I

DRIVING THE CAR

I. — GETTING THE CAR READY FOR THE ROAD

Inspections and sundry work to be done before running a new car.

Tightening electrical connections : Make sure the battery is well connected and that all connections are tight (1).

Pedal clearance : Check if pedals and particularly clutch pedal do not touch underside of floor-board. At rest, there must be a 3 cm. clearance (1 1/4").

(1) In case the chassis would be shipped with a dry and discharged battery, it is necessary at first to fill and charge the battery according to instructions given at chapter " Electrical Equipment ".

Priming vacuum tank : Remove vacuum tank cap and fill about 2 pints of petrol into tank. Clean carburetter strainer. Previously to its assembly clean connection from tank with petrol. Replace strainer and piping. When engine will run, vacuum tank will get automatically filled.

BEFORE STARTING THE ENGINE :

Water : Check if radiator has been filled.

Oil : Check oil level in engine.

Petrol tank : Fill rear tank with petrol.

Position of hand levers : See that the gear change hand lever is in neutral and hand brake applied.

Ignition control : Turn switch-key horizontally, so as to light red indicator lamp.

STARTING THE ENGINE :

Place mixture control lever at " Starting " position (" Depart "). Depress starter pedal. As soon as engine starts firing, release pedal.

We recommend to flood carburetter only slightly if ever needed.

When engine is started do not leave mixture control lever on " starting position ". This correction is to be used only for an easier starting when engine is cold.

USE OF SELF-STARTER :

If starter does not drive engine : If starter does not drive engine, this may be due to the fact that battery is not sufficiently charged; in such case, it is necessary to put it on charge. (See : Lighting and starting equipment.)

In the meantime, engine is started by means of crank-handle. If engine has not started, this may be also caused by a loose connection or a short circuit. Check accordingly if all connections are clean and tight, see as well insulation of wiring.

Starter drives engine, but same fails to start : In case the engine would not start within 16 to 20 seconds, do not use any longer the starter, but try and find the cause of non starting (lack of petrol in the tank, switch not " on ", etc.).

Position of mixture control : As soon as engine is started, place mixture control lever back to " normal " (medium position).

Starting an engine which was not used since long : If the car had not been used since a long time (for instance after completion of body-work), it is very important to have the engine running at 600 R. P. M. during several minutes and to wait until oil in sump be warmed up before accelerating the engine to full speed.

Serious damage might result if the engine was raced too fast immediately after starting up. On the other hand, running too slowly when cold may cause damage, as no splash would lubricate the cylinder walls. Always keep in mind it is not advisable to start off with a cold engine.

Starting up in cold weather : Take the same cares as above, covering the radiator to hasten warming up of engine.

II. — RUNNING INCIDENTS

A new engine must be " nursed " :

Do not race a new engine to its maximum speed for the first 300 miles, we recommend during such period not to exceed a speed of 35 to 40 m. p. h. From this care, too rarely ob-

served, will largely depend the life of engine. If run at full speed, the subsequent performance of the engine may be severely affected.

Use of mixture corrector :

The mixture corrector has for object to modify the mixture and have :

1. — A richer one for starting,
2. — Normal run,
3. — A leaner mixture for saving purposes.

The adjustment of carburettor giving the best results is effected at " normal " position. This adjustment is used at our works for the final tuning of chassis; this adjustment is slightly rich, both other adjustments are only to be used for correction purposes temporarily.

Accordingly " Leaner " adjustment is not to be used permanently but only when temperature allows it, since it was made only to correct excess of petrol when very hot. The driver will thus have an interest to run with " leaner " adjustment each time this will be possible : but he cannot run always in this position. For town service, let always corrector in " normal " position for good operation. Never run the car on " starting " position.

Positions of gear change lever :

We recall the positions of gear change lever are as follows :

1st speed : pushing forward and to the left up to first step.

2nd speed : pulling lever towards driver and the farthest to left.

3rd speed : pushing lever forward and the farthest to right

Direct : pulling lever towards driver and the farthest to right.

Reverse : as for 1st speed and push to the farthest forward.

Starting and gear changing :

Always start at lowest speed and clutch in gently.

Avoid clutch slipping when passing from one speed to another. Do not accelerate before clutch be completely engaged.

Hints on quiet gear changing :

We should recommend to proceed as follows to have a noiseless change of speed :

For shifting from 1st to 2nd and from 2nd to 3rd speed, stop an instant at neutral position before operating hand lever to throw gears in.

For shifting from 3rd to 4th speed, pull frankly lever towards the driver.

Usually for shifting from 4th to 3rd speed, from 3rd to 2nd and from 2nd to 1st, one uses to operate frankly the lever as soon as disengaging clutch; it is better to proceed as follows :

Disengage clutch, shift lever to neutral position, throw clutch in accelerating the engine; disengage again clutch shifting control lever to desired speed.

The driver will be quickly accustomed to such operation enabling him to change gear quite smoothly.

Avoid clutch slipping :

In any case avoid long slipping of clutch, this is quite unnecessary considering flexibility of engine and smooth pick-up

Pedal braking :

Never brake violently, mainly when running at high speed on a slightly wet slippery road; you would not slow down better and you would risk skidding.

Brake always gradually, foot reaction is sufficiently felt by the driving to enable him to control and master the action of braking.

Hand braking :

The same recommendation applies to hand braking. However, hand brake is rather used for braking car when stopped.

Braking in long descents :

When driving down, in order to avoid any too important heating of brake drums, use engine as a brake, clutching in 1th speed or if necessary an intermediate speed, but take care to shut off throttle entirely.

In any case, engine should not then be run at a speed higher than it would when driving car; i. e.

40 m. p. h.	on 3rd speed.
30	2nd
17	1st

Running the car in cold weather :

If it is very cold, it may be necessary to mask a part of radiator.

We recommend to this end the use of " radiator covers " allowing a complete or partial obturation at will and which, when entirely closed at stop, maintain a suitable engine temperature. Before starting off the car, run engine a little while at 600 800 R. P. M. so that the oil should reach a temperature of about 90° Fahrenheit (30° Centigrade).

Anti-Freezing mixture :

In order to avoid freezing of radiator water add, if desired, a mixture of alcohol and glycerine in following proportions : 2 1/2 litres of pure alcohol for 2 3 4 litres of glycerine. This mixture will freeze only at — 18° C. (0° Fahrenheit). Total capacity of circulating water amounts to about 19 litres (about 4 gallons).

Draining Radiator :

In frosty weather, if you do not use an anti-freezing mixture, it is necessary to drain out the cooling system. To this end, the radiator is provided with a cock at lower part, which when turned will let out the whole water contained in engine and radiator.

INSTITUTE



CHAPTER II

ADJUSTMENT OF THE CAR

I. — ENGINE TIMING

Adjustment of engine is as follows with a 0,4 mm. play between tappet and valve : (about 0,016").

Inlet opens : 5° after T. D. C., i. e. 0,1 mm. on piston stroke.

Inlet closes : 30° after B. T. C., i. e. 6 $\frac{mm}{m}$ on piston stroke.

Exhaust opens : 46° before B. T. C., i. e. 13,5 $\frac{mm}{m}$ on piston stroke.

Exhaust closes : 5° after T. D. C., i. e. 0,1 $\frac{mm}{m}$ on piston stroke.

It should be noted that above mentioned setting is obtained with a clearance of 0,4 $\frac{mm}{m}$ which can be reduced after adjustment to 0,3 for more silent running, without troubling about the apparent change, this may bring to the setting given hereabove.

In no case, should the tappet clearance be brought under 0,3 as this would have a most detrimental effect on engine performance at low speeds.

Important. — The silence of the timing gear of these engines being obtained by the special shape of the cams, it is imperative that :

To adjust valve N° 1, valve N° 12 should be at full opening.

2.	—	11	—	—	—
3.	—	10	—	—	—
4.	—	9	—	—	—
5.	—	8	—	—	—
6.	—	7	—	—	—
7.	—	6	—	—	—
8.	—	5	—	—	—
9.	—	4	—	—	—
10.	—	3	—	—	—
11.	—	2	—	—	—
12.	—	1	—	—	—

DECARBONIZING COMBUSTION CHAMBERS

Owing to the special type of combustion chamber on this engine, we recommend to keep same perfectly clean and free from carbon deposit.

Decarbonizing should then be done, every 5,000 Kms. (Approximately 3,200 miles). This is, however, a very easy job as the cylinder head carrying no moving part is removed in a few minutes.

a) The copper and asbestos cylinder head gasket should be stuck on the cylinder face with " hermetic " or similar varnish, whilst a light coat of " graphite grease " will be spread on the head facing. This will result in keeping the gasket on the cylinder whenever the head is removed.

b) The threads of all " holding down bolts " of the cylinder head should be kept perfectly clean and dipped into " graphite grease " before assembling.

c) The walls of the combustion chamber and pistons tops should be absolutely bright, the brighter the better as in such conditions the carbonization is reduced to a minimum, and the more carbon deposit, the quicker the engine will knock and need re-decarbonizing.

d) When re-assembling, all "holding down bolts" should be screwed in by hand and tightened progressively and firmly, following the order shown on sketch hereafter, going from center to end, the engine being warm. After the engine has been tested, and whilst it is still warm, see whether all bolts are a good tight-fit.

CHECKING CARBURETTER

The carburetter feed should be cleaned now and again : the vacuum feed tank will be drained and rinsed, the carburetter strainer will be cleaned, the sliding cap removed and washed with petrol, also the carburetter body itself.

The jets should be found clean and petrol syringed through, to remove any dirt that may clog them up.

INSPECTING IGNITION SYSTEM

a) The platinum points should be kept at the proper gap given by the small gauge on the adjusting spanner, found in the tool-kit and which is about 0.5 mm. (0.02"). These must be kept absolutely clean and free from any white deposit.

Should such be found, it will be necessary to remove the platinum screws and grind them slightly with a little oil stone to make them bright and slightly ball faced.

b) The sparking plug gap is to be kept at 0.4 mm. (0.015"). Make sure that all wires are well and tightly connected. See also that the platinum points on the distributor begin to part when the "rotor" comes in front of one of the terminals (fig. 20, page 49).

This can be checked by bringing said rotor in the center of the notch on distributor housing when it should be found that "breaking" begins. In case this should not be found correct, the breaker non-metallic arm should be bent the proper way.

SUCTION PIPINGS

Suction pipings and connections thereon are :

1° From rear of intake manifold to vacuum feed tank.

2° From ————— servo-brake.

Any air leak through these may cause difficulties in starting and general performance of engine, whilst interfering also with working of petrol feed or servo-brake.

ADJUSTING CARBURETTER

Adjustment of carburetter is such that with present fuel features, engine will be run immediately after starting with "mixture control" on "normal" and a few minutes later, when a certain temperature has been reached, the lever can be pushed down to "pauvre" to give a leaner mixture and save petrol, without any inconvenience for car performance.

The proper setting is obtained by means of adjustable end of tappets.

II. — ADJUSTING CARBURETTER

It may be possibly necessary to change such adjustment if other qualities of fuel are used.

To replace nozzles, follow instructions hereunder : adjust at first for smooth pick up and change 1st and 2nd jets only, mainly the 2nd one; then adjust for maximum power and replace 3rd and 4th jets.

Make adjustments always with mixture lever on "normal" position in order to be eventually able to obtain a leaner mixture when engine will be hot.

We recall that jets are calibrated in cubic centimeters per minute and not according to diameter.

To remove jet-carrier, see page 13.

When stopping on a climb or on the side of a bulged road,

or if the car is not to be used for a while, take care to shut off vacuum tank cock.

To shut off petrol, turn fully to the right.

To open petrol, turn fully to the left.

It is necessary, every 600 miles to clean fuel strainer located under carburettor to avoid its obstruction through very fine foreign matters in suspension into fuel.

In case of stoppage of car due to lack of petrol, to avoid priming of vacuum feeder, fill in direct with the petrol can, after removing plug at upper part of tank.

Apart from cases of obstruction of carburettor strainer, or fuel piping, very easily traced, take care that air fortuitously admitted into vacuum feed suction piping does not impede operation of the latter.

III. — IGNITION & SETTING

CARE OF DISTRIBUTOR :

As far as lubrication is concerned see further chapter " Lubrication ".

Clean distributor cap from time to time with a soft dry cloth and check adjustment of platinum screws of make and break using the gauge on special spanner supplied. Contact faces must be always carefully clean; if they show traces of wear, smooth them with a hone and carefully take out metal dust.

Never lubricate neither make and break mechanism nor distributor.

Firing order 1, 5, 3, 6, 2, 4; cylinder N° 1 being the one nearest to radiator.

SETTING THE DISTRIBUTOR :

To adjust distributor, bring ignition advance lever, on steering to half its stroke; crank engine to bring piston N° 1 to T. D. C. (end of compression).

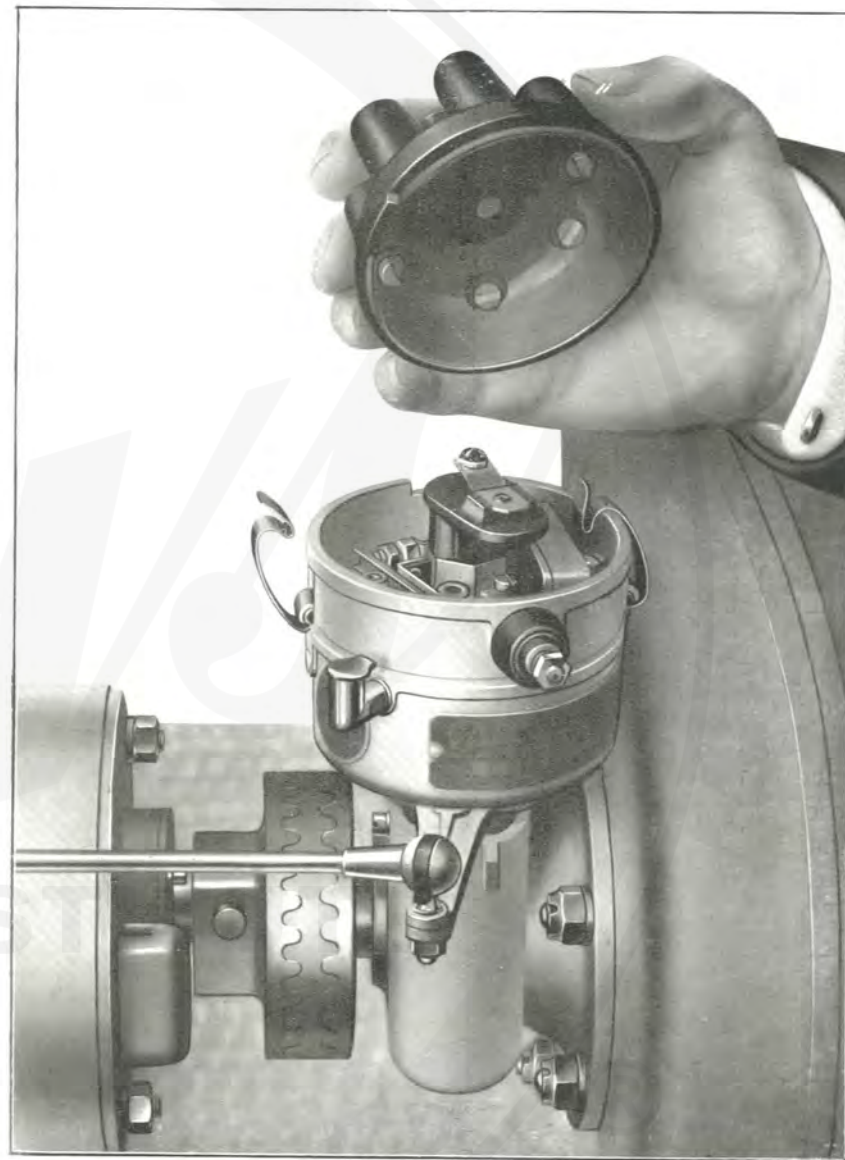


Fig. 20.

Remove distributor cap. Loosen ignition control collar on distributor head. Turn distributor head by hand until breaking at terminal N° 1.

Tighten collar and replace distributor cap taking care it enters into its notch.

Spark plug wires are numbered at each end. Connect them to distributor in the above order : 1, 5, 3, 6, 2, 4, from N° 1 marked on cap.

Adjust carefully spark plug gap to $\frac{1}{16}$ of mm.

Clean outer porcelain of plugs to maintain full efficiency of insulation.

IV. — ADJUSTING VACUUM SERVO & BRAKES

Vacuum brake itself has no part exposed to wear; there is thus no necessity of an adjustment.

When dismantling and assembling vacuum brake take care not to modify length of connecting rods to obtain original adjustment.

In case the length of connecting rods would have been modified, restore correct lengths in order that opening of vacuum valve takes place before butt of pedal operates cross-shaft and stretches the chain, the piston being on its resting position. One must have a stroke of about 2 cms at top end of pedal. Take care for such adjustment that 1 mm. play between finger (T) and eye (U) (illustration N° 3) be always towards front of car.

ADJUSTING BRAKES :

Brakes are adjusted by means of wing nuts placed at end of brake cables.

To have an equal adjustment of 4 brakes, proceed as follows :

Checking brake adjustment. — To check brake adjustment and see if it is correct, run the car for about 5 minutes with the brakes slightly applied. The 4 brake drums must have the same temperature. A temperature difference of brake drums detect a defect of adjustment or greasy drum due to too abundant oiling of front wheel hubs or too high a level in rear axle.

The brakes must work dry. — For an efficient braking it is necessary to keep the brake linings absolutely dry. If on account of too abundant greasing of front wheel hubs or too high an oil level in rear axle, brake linings become greasy, a simple washing in petrol will restore brakes in good state. Take care oil draining holes of brake drums be not stopped by mud.

To make a good adjustment, jack up the car in order to free all 4 wheels and adjust to have a simultaneous braking.

If brakes and vacuum servo-brake are normally adjusted, one must have a 6 cms. pedal stroke for stopping car on a macadam road.

Wear compensating device of front and rear brakes. — After a certain period it is no more possible to compensate front or rear brake wear by means of wing nuts at each end of control cable, it is necessary to turn, of a suitable angle, control levers operated by the cables or to reduce length of cables fixed at their ends to an eyelet and secured by means of two locking bolts.

V. — SPRINGING OF THE CAR

INFLATING TYRES :

It is absolutely necessary to observe following instructions to inflate tyres.

Take the weight of the car on front and rear axle without passenger.

Then add to load on front axle the 1/3 of weight carried (passengers, luggages, etc...) and to the load on rear axle add 2/3 of weight carried (passengers, luggages, etc...).

This being done, inflate the tyres to the pressure given by the tyre manufacturer.

ADJUSTING SHOCK ABSORBERS :

Hartford shock absorbers must be moderately and evenly tightened.

To this end we recommend not to tighten sharply but gradually with a spanner only 5 to 6 inches long.

Notice : Check from time to time tightness of nuts of front spring clipping bolts.

CHAPTER III

LUBRICATION AND GENERAL CARE

LUBRICATING ENGINE

Lubrication system : See page 5 specification of lubrication system.

Oil level of crank case : Oil level of crank case must be checked every day, using the dipper-gauge which shows the exact quantity of oil remaining in the sump.

Gauge is graduated from 0 to 5 litres.

Attention is drawn to the fact that our gauges are graduated in such a manner that crankcase contains already 2 litres at 0 of gauge, this corresponds to an indispensable safety reserve. In fact, oil circulation amounts to 7 litres, when gauge shows 5.

Draining and level cock :

Each engine is provided with a 2 ways cock :

F shows closed position (or *running position*).

V shows *total draining position*.

Minimum level for run :

Under no consideration should the car be used with less than 2 litres at gauge.

Periodical draining of crank case oil :

In case of a new engine, it is a good practise to drain oil and re-fill with fresh oil after about 500 miles run.

Afterwards, the engine being thoroughly run-in, oil should be changed every 600 miles in winter, 1,200 miles in summer.

To drain crank case, place level cock on " V " position. This must be done engine being warm, after a run.

Oil strainer :

Every 600 miles clean oil strainer located on left side of crank case. See page 4 for dismantling instructions; in case of a new car, clean strainer after the first 200 miles and repeat this after an equal distance again.

Quality of oil to be used :

In summer.....	" Castrol AA " or " Gargoyle Mobiloil A "
In winter and exceptionally for very low temperatures (—10°).....	" Castrol C. W. " or " Gargoyle Mobiloil Arctic "

GENERAL LUBRICATION OF THE CAR

Engine : Check oil level every day (see previous paragraphs).

For dynamo, use very fluid oil.

Chassis : The grease gun supplied in tool-kit provides an efficient and quick lubrication without risk of getting soiled or waste of lubricant.

Quality of oil to be used for chassis :

Except for special parts mentioned in the previous paragraphs (engine, dynamo and front wheel hubs) use " Castrol Gear Ease " Gargoyle Mobiloil C.C. " or a similar quality, but *no grease*.

Points to be oiled about every 300 miles (1).

From outside of chassis (Illustrations n° 4 and n° 5).

1-8. Front and rear spring pins.....	14 lubricators.
2. Front brake control forks.....	2
3. Camspindles on front brakes.....	2 —
4. Ball joints of front brake brackets on radiator	2 —
5. Steering swivels.....	2 —
6. Steering pull and push rod.....	2
7. Coupling rod of front wheels.....	2 —
9. Rear brakes cam spindles.....	2 —
9. Inner ball bearing of rear hub.....	2 —

Under bonnet (Illustration n° 4).

28. Fan spindle.

Under front floor (Illustration n° 4).

13. All joints of valve control of vacuum brake : with oil can.

Points to be oiled every 600 miles.

Under bonnet (Illustration n° 4).

27. Dynamo (a few drops of oil).
27-14. Lubricator on ignition distributor.

(1) Numbers of points to be oiled correspond to oiling diagram.

- 15. Ball joints of small controls (a few drops of fluid oil).
- 16. Carburettor control cross-shaft (with oil can). 2 lubricators.

Under front floor board (Illustration n° 4).

- 18. Brake cross-shaft..... 2 lubricators.
- 19. Pedal assembly..... 1
- 20. Clutch thrust ball-race (remove aluminium cover fixed with 2 nuts to upper part of clutch casing)..... 1 —
- 21. Connections of vacuum brake control 1 —
- 22. Torque ball joint at rear of gear box. 1 —
- 23. Forks of hand brake connecting rod (clean and oil).
- 24. Ball joint of steering pillar (a few drops of oil).
- 25. Hand brake lever spindle (a few drops of oil).

Under rear floor board (Illustration n° 4).

- 26. Roller bearing at centre of cardan shaft. 1 lubricator.

Points to be oiled every 3.000 miles.

From outside (Illustrations n° 4 and n° 5).

- 29. Starter (a few drops of oil).
- 30. Front wheel hubs (fill with grease of best quality).
- 31. Steering box (fill casing up to mid height with oil "Castrol DG" or "Gargoyle Mobiloil C" through hexagonal plug located at upper part of casing. Lubricate the lever spindle with gun... 1 lubricator.
- Gear case (Fill with thick oil "Castrol DG" or "Gargoyle Mobiloil C" through hexagonal plug at upper part of gear box, up to aperture of level plug located at left side of gear box).

Rear axle (Big hexagonal filling plug at upper front part of differential casing). Thick oil "Castrol DG" or "Gargoyle Mobiloil C" up to small hexagonal level plug located at lower part of differential casing rear cover.

Notice : — Never remove small plate fixed by two screws to front part of differential casing. Again, never remove hexagonal plug at front *under part* of differential casing.

Fill differential casing in warm state, i. e. after the car has run a while.

Points to be oiled every 10.000 miles.

Dismantle suspension springs, clean the leaves and assemble, smearing the leaves with graphite grease. After such operation, it is necessary to lighten spring clips after a while due to expulsion of a part of grease between spring blades.

We recall again to check if front spring clip-nuts are tight about every 6.000 miles.

Notice. — We recall not to forget to fill battery with distilled water about every 600 miles, in order to cover the plates.

We recall also to drain crank case and fill in fresh oil every 600 miles in winter and 1.200 miles in summer.

INSTITUTE





IMP. DE MONTLIGEON
LA CHAPELLE-MONTLIGEON (ORNE)
17959-4-28.

INSTITUTE



R. C. : Seine 42.049

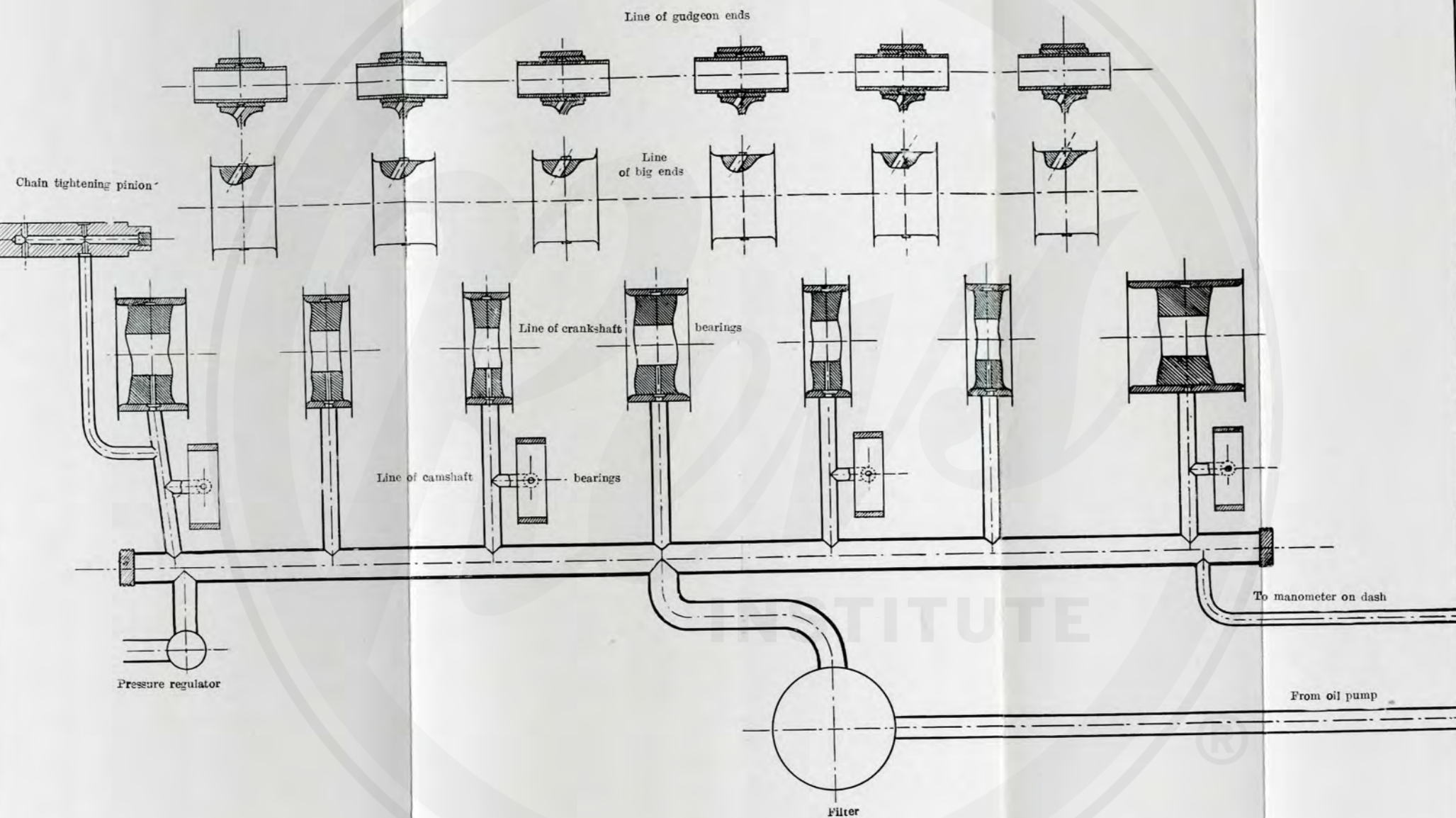


Diagram № 1.

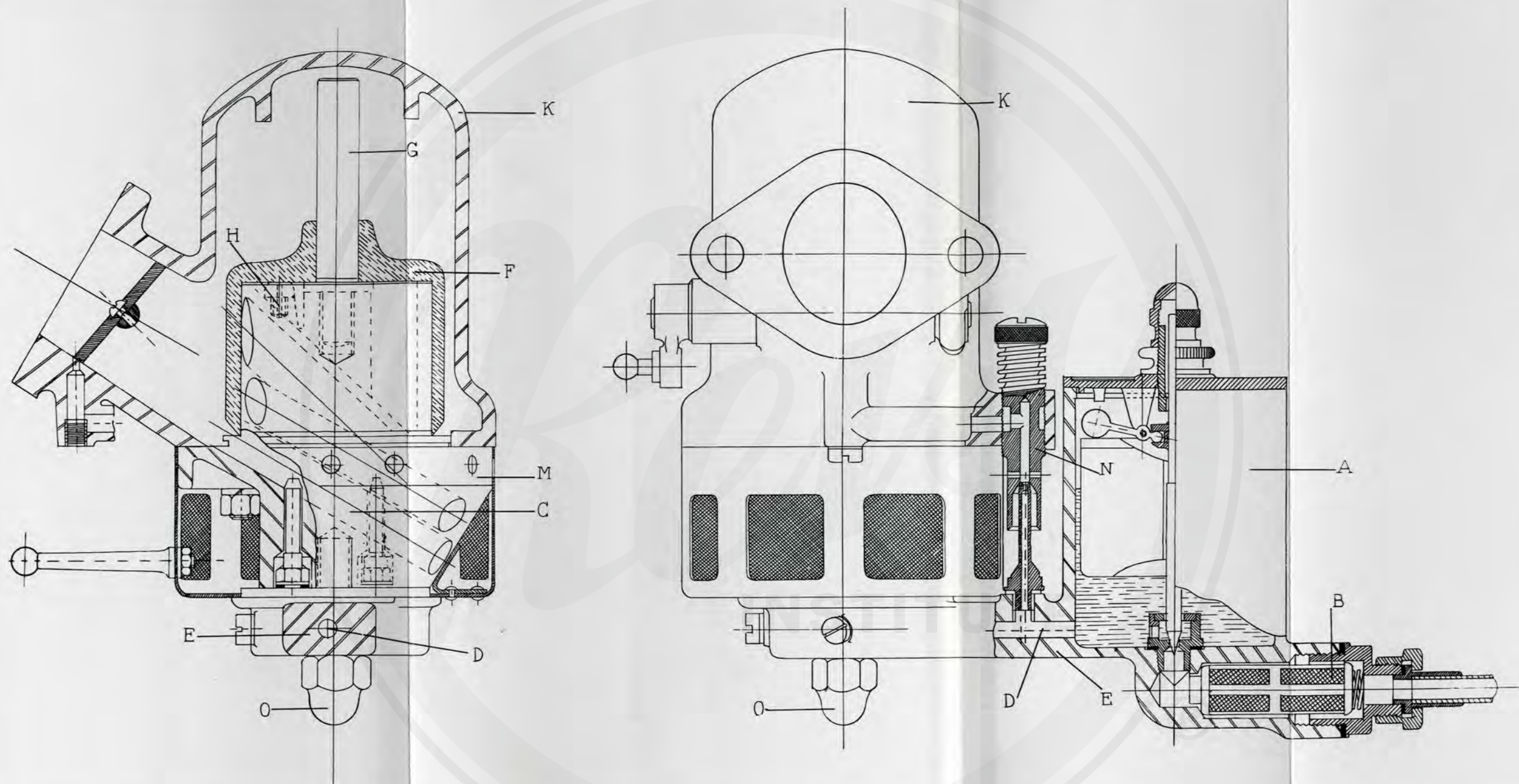
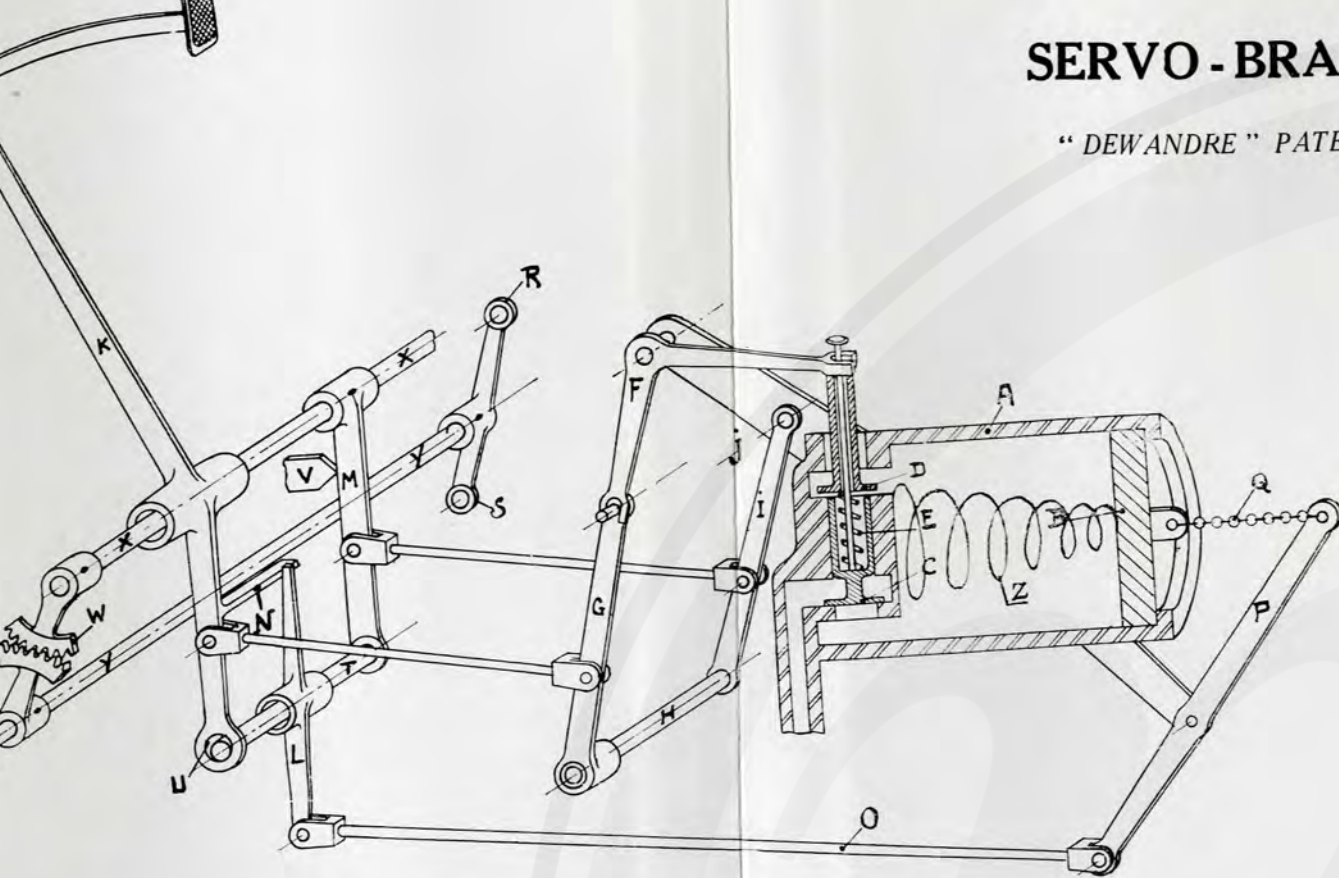


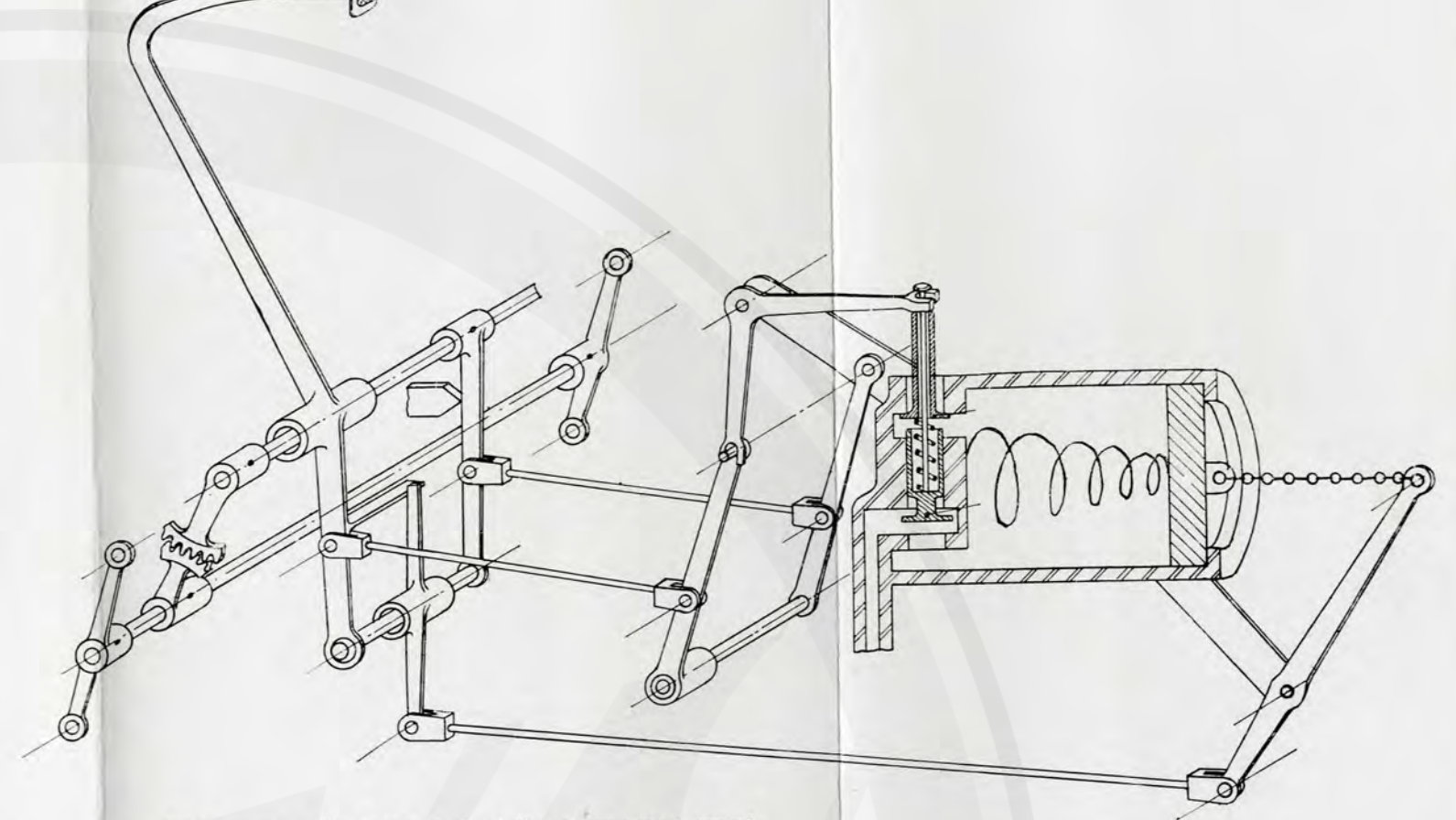
Diagram № 2.

SERVO - BRAKE

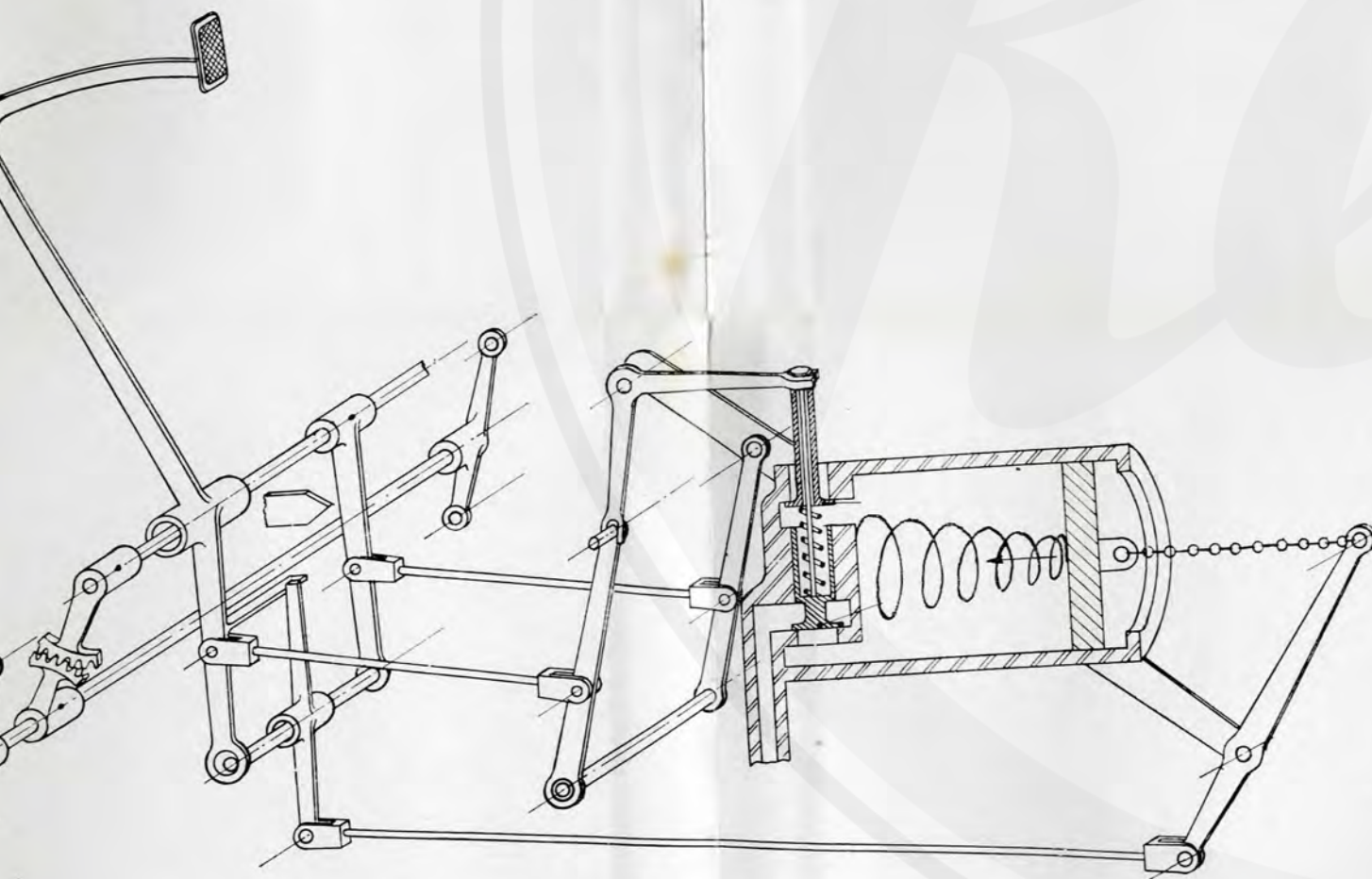
"DEWANDRE" PATENT



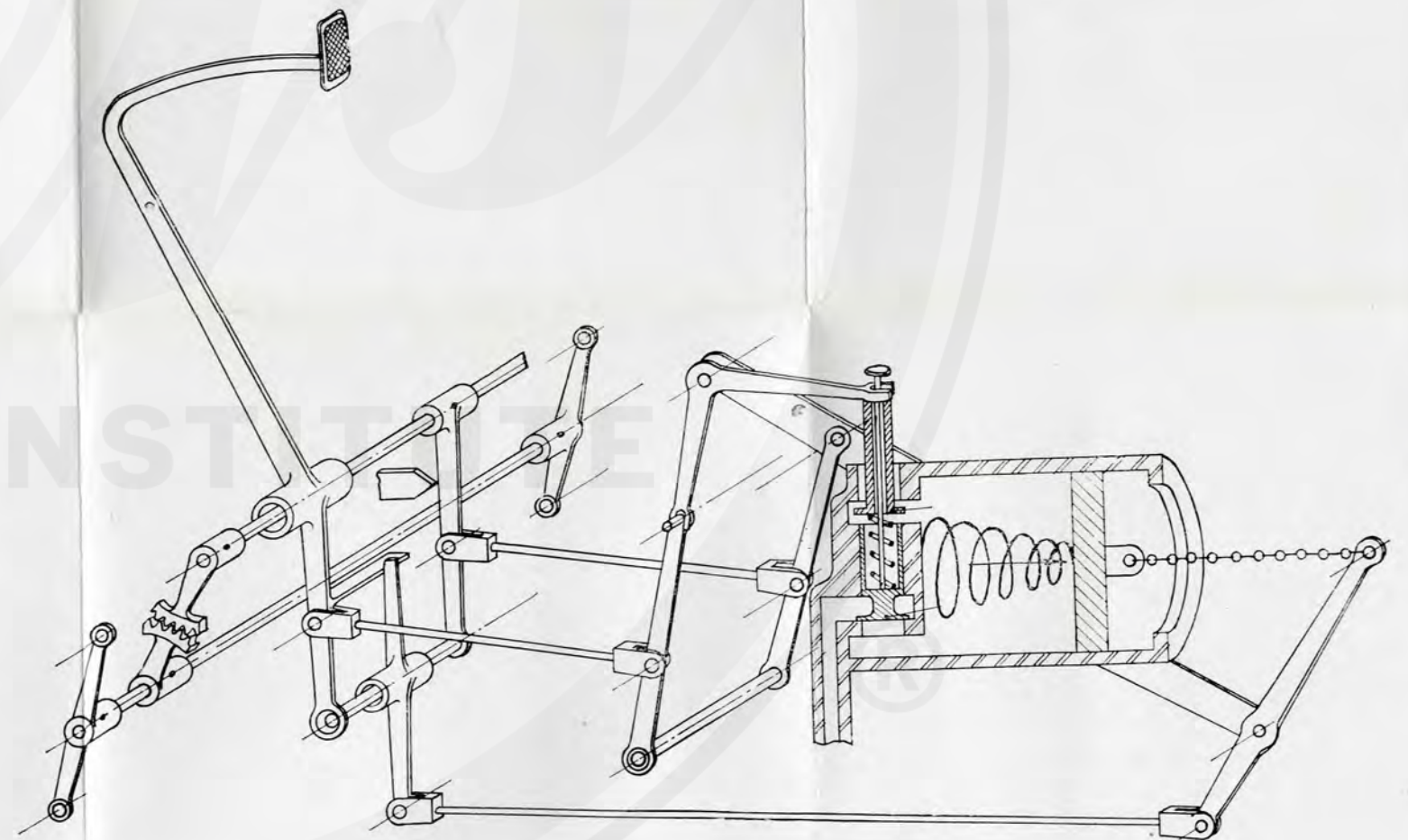
REST POSITION.



1st POSITION. — The air valve is closed, the vacuum valve is opened.



2nd POSITION. — The piston moves in the direction of the arrow and the 2 valves are closing.



3rd POSITION. — The pedal is released the air valve is opened and the piston comes back to first position.

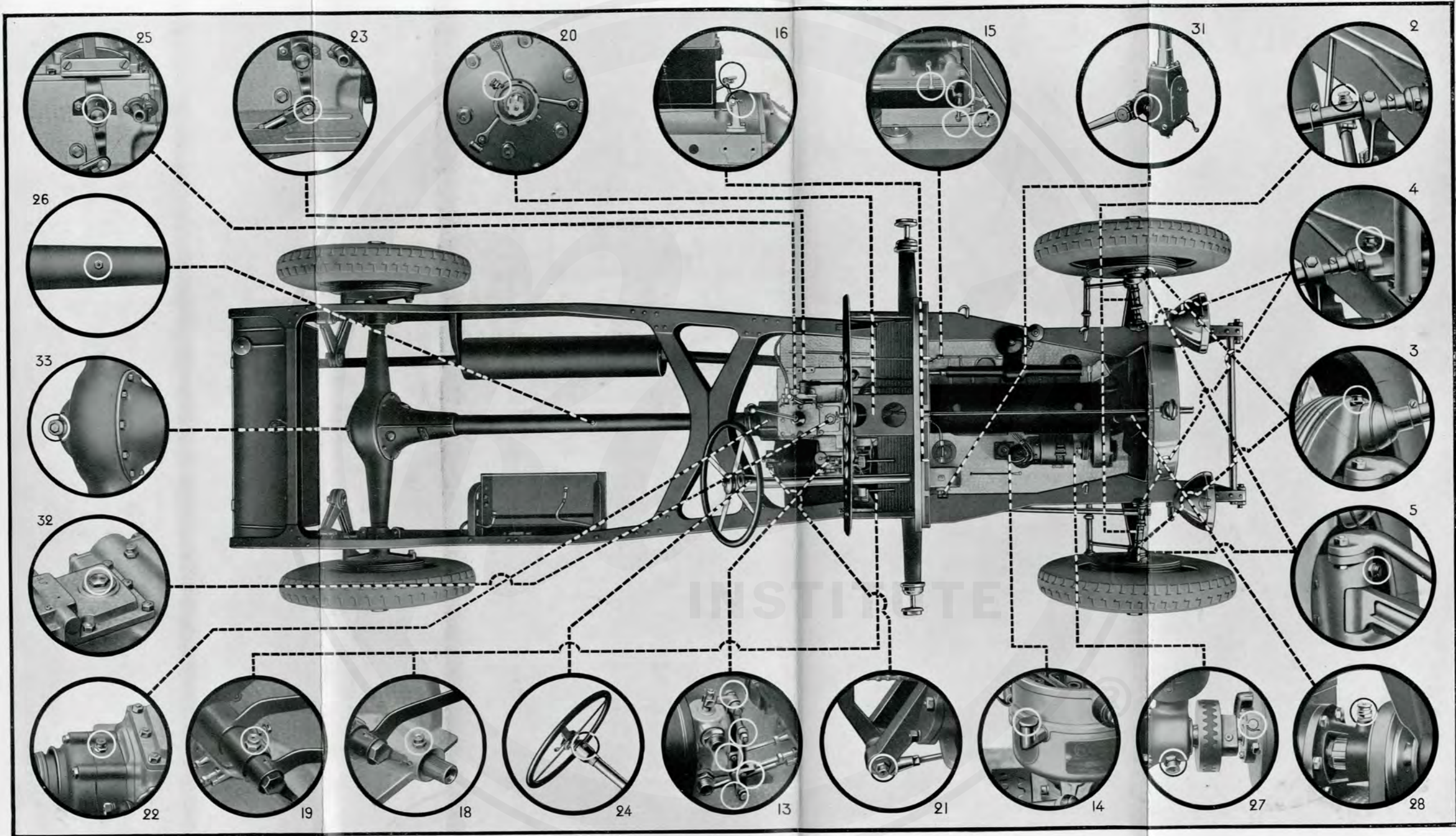


Diagram N° 4.