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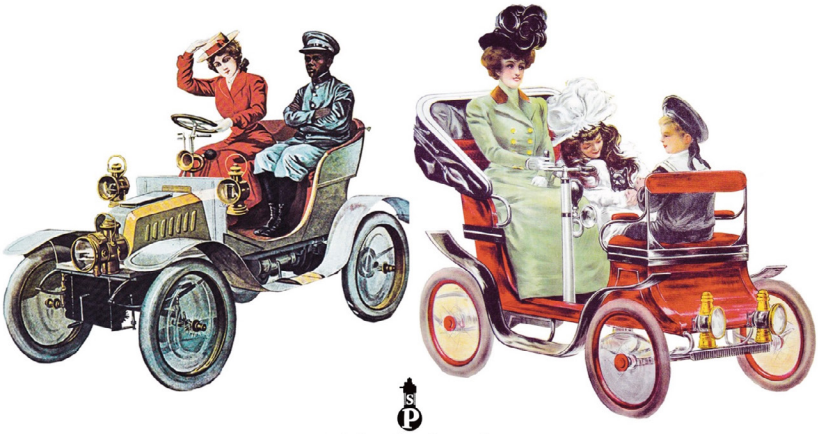
De Dion Bouton

An Illustrated Guide To Type & Specification 1899-1904



Michael Edwards

In the first few years of the 20th century the level of technical progress in the construction of motor cars was remarkable, as evidenced by the output from De Dion Bouton's Puteaux works.

In September 1899 the company produced its first rear-engined, four-wheeled, twin-speed vehicle with a single cylinder engine, an unsprung back axle, no rear brakes, and very limited accommodation. Between 1899 and 1904 De Dion Bouton produced 16 Types of passenger vehicle in single and twin cylinder configuration. By 1904 the company was manufacturing fully sprung vehicles capable of carrying limousine coachwork and a full complement of passengers in comfort over long distances.

With the help of more than 50 line drawings and 150 colour photographs, this book sets out to trace the course of vehicle development, summarises the essential technical information, and clearly identifies the characteristics of each Type.

De Dion Bouton: An Illustrated Guide to Type & Specification 1899-1904 will be of interest to all veteran car enthusiasts with the appetite to learn more about the vehicles produced at the turn of the century by the world's largest engine manufacturer.

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Single Cylinder Engine

The De Dion Bouton engine installed in the early voiturettes was a direct descendant of that used with the early motorised tricycles and visibly similar. The cylinder body was still manufactured from cast iron, in a single casting, albeit without the radiating ribs for cooling, which were no longer needed. The crankcase contained the same arrangements: both the internal flywheels are heavy, to promote balance, and the other components are characterised by their light construction. The piston is of machined cast iron with skirts less than 2.5mm thick, the connecting rod is an 'H' section of forged steel, the vertically split crankcase is an aluminium casting, which was innovative at the time of early tricycle production, and both the cast-iron head and barrel have slim profiles. The crankcases were made of aluminium for lightness. Many manufacturers used cast iron at this time for its sound-deadening qualities, but it was significantly heavier. Bronze bearings are used throughout.

The engine is equipped with an automatic/atmospheric inlet valve, where the valve is kept closed by a spring. The inlet valve is inverted with the aim of keeping the spring cool, and of bringing the valves as near to the piston as possible, thus avoiding any waste of compression space not directly over the piston. The valve is sucked open by the action (atmospheric pressure) of the descending piston, which simultaneously draws into the combustion chamber the explosive mixture, and is closed by the action of the coil spring assisted by compression pressure. Early petrol was of poor calorific value and hence emitted sooty combustion products, which tended to leave sticky deposits on the shiny surfaces, especially the valve stem and seat. With the 'bell-head' arrangement launched in 1898, the process of cleaning the seat of the inlet valve became infinitely more straightforward. Simply by loosening the nut on the chamber pipe and slackening the screw at the head of the sleeve, the cage mechanism that is held in place by a bayonet-type fitting can be removed and the inlet valve lifted, giving access to the exhaust valve.

The De Dion Bouton electric system consists of an induction coil that has primary and secondary windings. The primary circuit is energised by a dry cell battery through a contact breaker operated from a half-time engine shaft at the required moment of ignition, thus inducing a high tension current in the secondary circuit, which is connected to the spark plug located in the valve pocket of the combustion chamber. The contact breaker has a wedge-shaped head on a fixed spring that drops into a notch on a rotating plate fixed to the end of an exhaust camshaft that briefly makes and then breaks a contact in the primary circuit (Fig.1 & Fig.2).

Efficient running of the circuit is dependent upon the spring tension and points gap. The driver has an advance and retard lever that provides the ability to alter the timing of the spark and effectively moderate the speed of the vehicle. Exposure of the contact breaker to the elements will interfere with its efficiency, and so the device is normally enclosed in an aluminium cover.

The combination of lightweight components, good engine balance courtesy of the heavy flywheels, efficient lubrication, utilization of bronze bearings that were replaceable by dealers, an effective electrical system and easy access meant that the initial engine design continued to be used for all single cylinder vehicles in the period under review here. The engines increased in capacity from 3.5hp to 8hp, and so the external dimensions grew (Page 13). There were also some general improvements to the ignition system, and ultimately the twin cylinder models moved to a single blade device in 1903. The exhaust port evolved from a horizontal exit at the front of the valve box to one with a downward profile (Page 15), and ultimately (from 1902) the coil was positioned at the left hand side of the engine to facilitate cooling, where it then remained for all single cylinder engines. The profile of the top of the cylinder casing was also remodelled. In all other respects, the initial design remained unchanged from 1899 to 1904.

Fig.1: Type 2 contact breaker (1902-3)

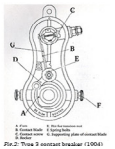

Fig.2: Type 3 contact breaker (1904)

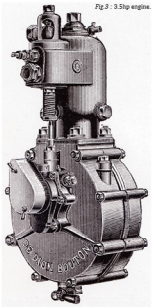

Fig.3 : 3.5hp engine.

This design of 3.5hp engine was restricted to the Type D voiturettes. The main distinguishing feature is the horizontal exhaust port. There is an oiler point on the right hand side of the crankcase flat, for easier owner access, faces to the rear of the vehicle when installed. There is an exhaust valve centred on the nearside of the mounting plate, operated when the vehicle is stationary

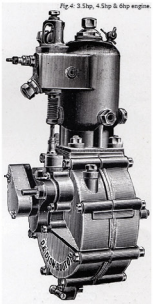

Fig.4: 3.5hp, 4.5hp & 6hp engine.

Design of the 3.5hp, 4.5hp and 6hp engine for the Type B, G1, G2 and L voiturettes. The exhaust port now has a pronounced downward sloping profile. The oiler point remains on the nearside of the engine. There is provision for a driver operated exhaust valve centred on the right hand side of the plate that carries the contact breaker

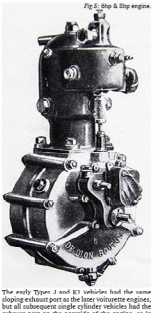

Fig.5: 6hp & 8hp engine.

The early Types I and K1 vehicles had the same sloping exhaust port as the later voiturette engines, but all subsequent single cylinder vehicles had the exhaust port on the nearside of the engine, as in this illustration. The forward-facing engines of the front-engined vehicles were different in two other respects: the oiler point was on the offside, and so closer to the driver who operated the dashboard lubrication, and the exhaust valve lever had moved to the left hand side of the mounting plate.

Voiturette: Type G2

Within the official Type classification, there is only one Type G. However, the later examples have so many specific characteristics that set them apart that Mortimer-Mégret, writing in 1904, created an unofficial Type G2 category that has been widely used subsequently. The Type G2 retains the larger capacity 4.5hp engine (84mm cylinder bore and 90mm stroke) as previously, but it now has a 35mm inlet valve, the distinguishing features include plain bearing wheel hubs of greater length and a pronounced external bulge between the steel spokes, on which is incorporated a Stauffer greaser. The earlier, slightly rectangular gear pump is replaced with a vane-type centrifugal pump in a larger circular bronze casing. This engine is the last to be mounted in the voiturette chassis on four straight bearer arms.

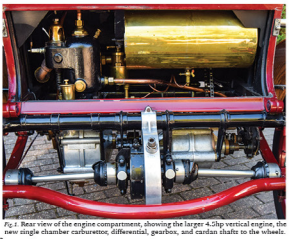

Fig.1. Rear view of the engine compartment, showing the larger 4.5hp vertical engine, the new single chamber carburettor, differential, gearbox, and cardan shafts to the wheels.

Fig.2: The newly introduced vane-type centrifugal water pump that becomes the standard design for all single and twin cylinder types.

Fig.3: The single chamber carburettor replaces the twin chamber model, and is used in all subsequent single cylinder vehicles. The size of the inlet pipe (right side) and outlet pipe (left side) vary by vehicle type, as does the overall size of the appliance.

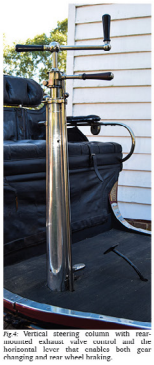

Fig.4: Vertical steering column with rear-mounted exhaust valve control and the horizontal lever that enables both gear changing and rear wheel braking.

Fig.5: Three-quarter elliptical springs and band brakes to the rear.

Fig.6: The Type G2 has the engine mounted in the chassis on four straight bearer arms.

Fig.7: Steering arm assembly of the Ackermann Type positioned behind the front axle with plain dropped kingpins.

Fig.8: Rear wheel plain bearing hub with the pronounced central bulge and Stauffer greaser.