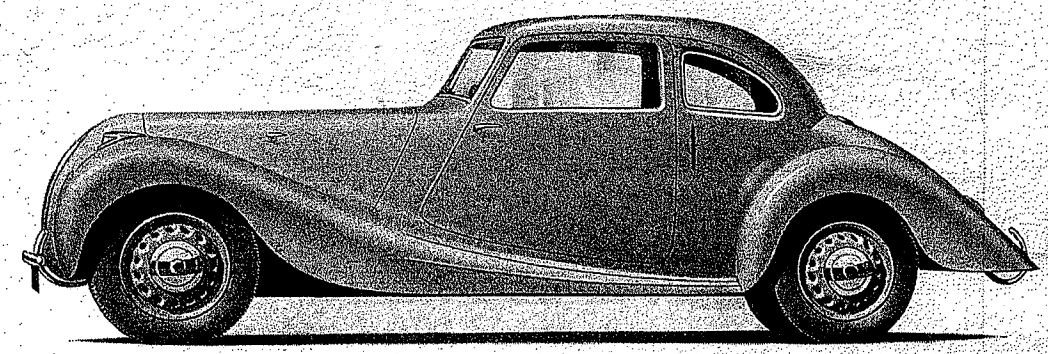
Information on the 2-litre

BRISTOL

Models



SALOON	Price **£1,450** (Purchase Tax £403 . 10 . 7)	Total **£1,853 . 10 . 7**
CABRIOLET	Price **£1,500** (Purchase Tax £417 . 8 . 4)	Total **£1,917 . 8 . 4**

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BRISTOL AEROPLANE CO. LTD.
6, ARLINGTON ST.,
ST. JAMES,
LONDON, S.W.1.

"A Car of Outstanding Qualities and Performance"

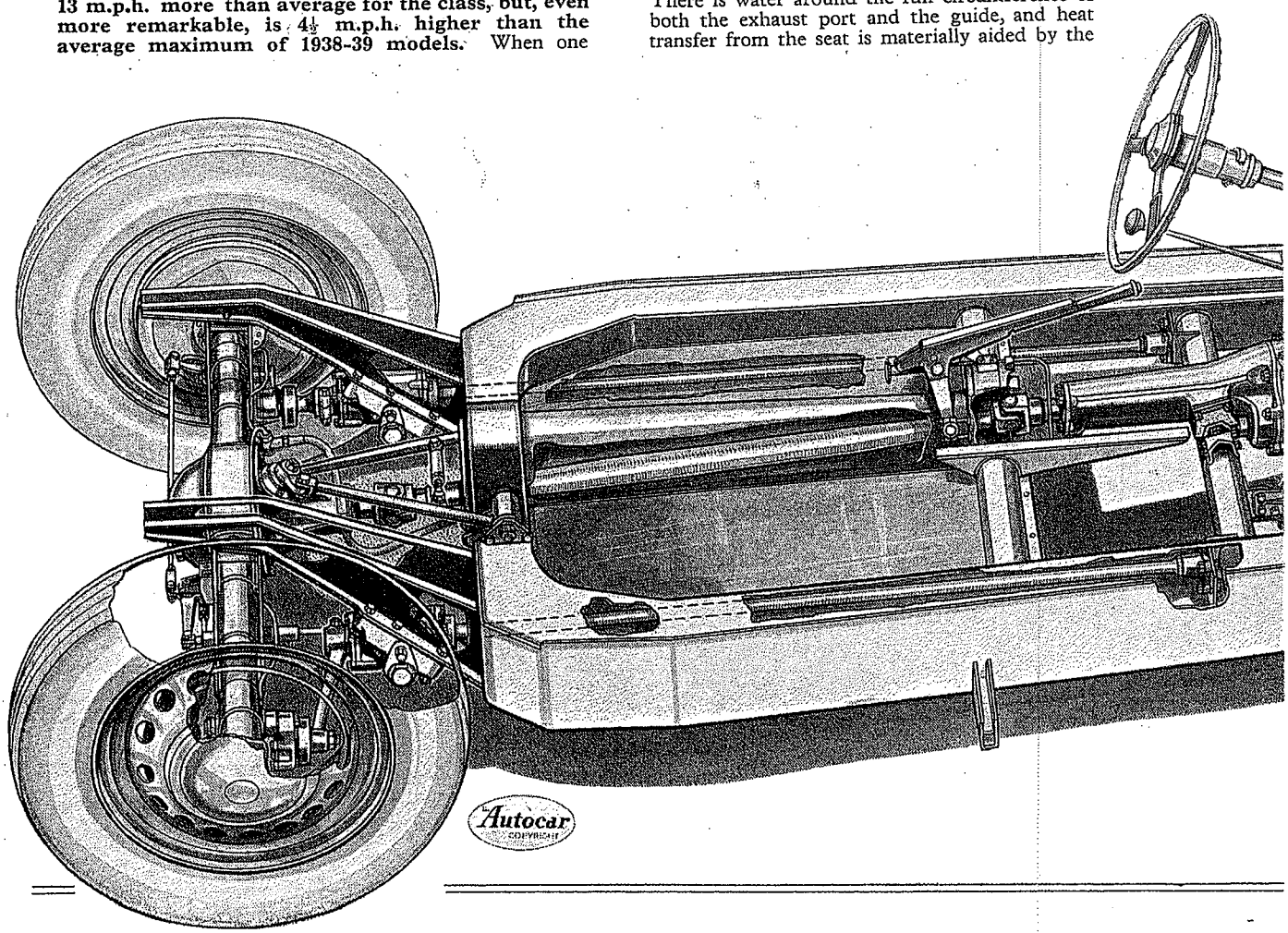
—"THE MOTOR."

"The Motor" in its recent description of the post-war Bristol Models (extracts from which are reprinted here) discusses the design of the car in relation to the average cars between 1½-litres and 2½-litres capacity which are now marketed.

THE outstanding statistical feature is undoubtedly the remarkable figure of 77 b.h.p. per ton, this being over 40 per cent. better than the average of comparable cars listed in "The Motor" (1946) specifications. Indeed, the margin of superiority is so great that it would be suspect if it were derived entirely from abnormal power output. In fact, however, the car represents a very acceptable compromise on this score, for whereas the figure of 2.67 h.p. per sq. in. of piston area is 26.5 per cent. better than average, it is not so high as to cause any difficulties on the score of loss of tune or unreliability. On the other hand, the dry weight figure of 22 cwt. is remarkably low, and has only been achieved by the utmost study of detail, as will be disclosed in the ensuing technical description.

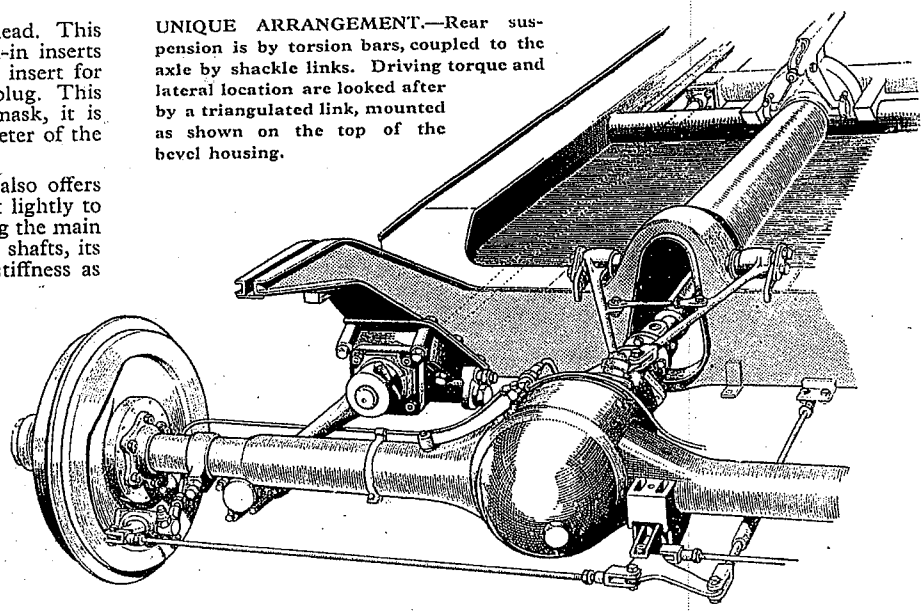
The combination of 85 b.h.p. with this low weight enables outstanding performance to be realised. Perhaps of even greater value in year-to-year running is the fact that at 2,500 f.p.m. piston speed the Bristol is cruising at 77.5 m.p.h., whereas the class average (again according to the "The Motor" 1946 specifications tables) is 64.2 m.p.h. In other words, the safe sustained speed of the Bristol is not only 13 m.p.h. more than average for the class, but, even more remarkable, is 4½ m.p.h. higher than the average maximum of 1938-39 models. When one adds that the basic design is renowned for lightness and accuracy of control, reliability and extreme length of life, it is obvious that the new Bristol can start life with unusually strong claims to be entitled a car of the first order.

The power unit, for example, has a single chain-driven camshaft mounted in the block, but also embodies valves inclined at 90 degrees in the cylinder head. Each inlet valve is worked directly through a push rod and rocker, but the exhaust-valve mechanism includes, in addition, transverse push-rods carrying the motion from the camshaft across the head. This ingenious mechanism is fully disclosed in a perspective drawing of the engine, from which one can at the same time observe the remarkably good flow characteristics of the paired induction ports. These breathe through three downdraught S.U. carburetters, and although the engine is conservatively rated for road use, it is easily possible by carburetter adjustments to raise the m.e.p. to well over 130 lb. per sq. in. at 5,000 r.p.m. It is safe to say that no other engine has a more direct inlet porting system than the Bristol, but it is of equal importance to observe that cooling on the exhaust side has been given careful attention. There is water around the full circumference of both the exhaust port and the guide, and heat transfer from the seat is materially aided by the



use of a light-alloy casting for the head. This in turn involves the use of shrunk-in inserts for the valve seats and a threaded insert for the rather deeply masked sparking plug. This is of 10 mm. diameter, and the mask, it is interesting to note, is the full diameter of the thread.

The general layout of the head also offers a secondary advantage which is not lightly to be disregarded, viz., that by carrying the main casting up to the level of the rocker shafts, its depth is sufficient to afford great stiffness as a beam, and hence distortion, with subsequent irregular running or even gasket failure, is avoided.



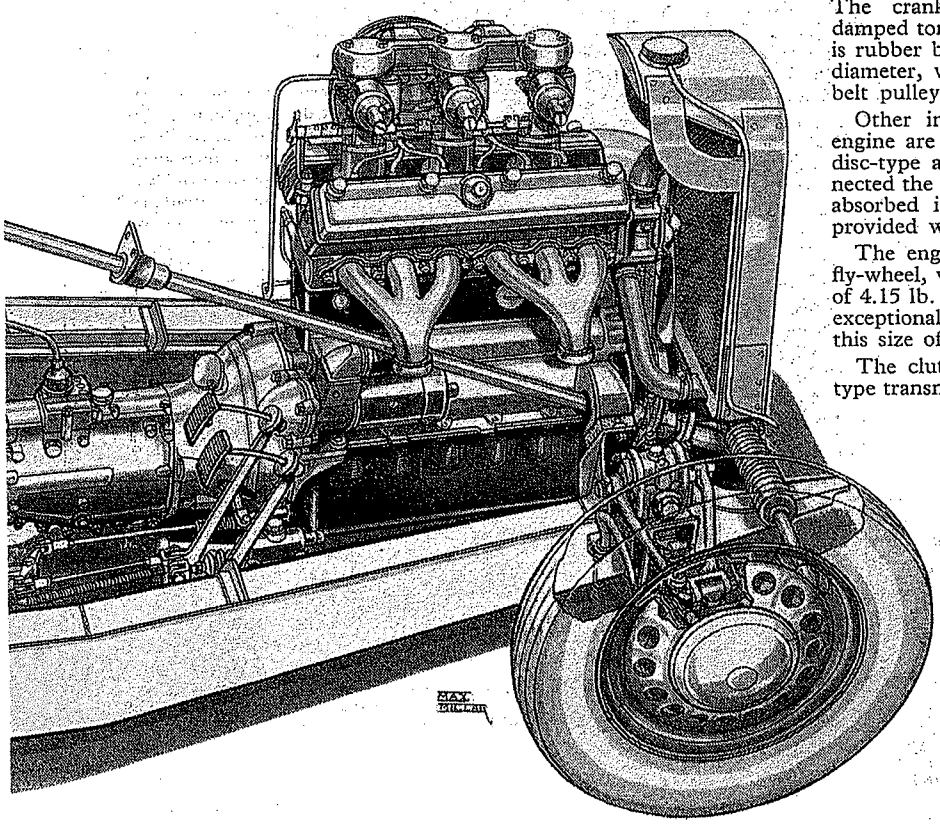
UNIQUE ARRANGEMENT.—Rear suspension is by torsion bars, coupled to the axle by shackle links. Driving torque and lateral location are looked after by a triangulated link, mounted as shown on the top of the bevel housing.

SAVING WEIGHT

Stiffness is also a keynote of the cylinder block, although at the same time every effort has been made to keep the dimensions to a minimum, with a view to weight saving. It is, indeed, somewhat remarkable that with the cylinder bores accounting for an aggregate of 15.6 ins. the total length of the block is only 20 ins., although there is a reasonable water space between each pair of cylinders; that is above each main bearing. Ample bearing area is provided by virtue of having a shaft 2 in. in diameter. The shaft is hardened, and the bearings are the copper-lead strip type.

The steel connecting rods are short (stroke × 1.71), and are drilled to provide full-pressure lubrication right up to the gudgeon pin.

The pins are mounted somewhat lower in the piston than is usual and are retained by circlips. The pistons in themselves are also of interest, for they are made from pressings, a construction which offers particular advantages in light weight, with metal of excellent grain flow and consequent high strength, particularly at elevated temperatures.



"OIL COOLING"

The lubrication system is very thoroughly carried out and includes a full-flow filter and a temperature stabilizer. The latter consists of a finned tube placed the full length of the water intake, which is low down on the exhaust side of the cylinder block. In normal running, and particularly when starting from cold, the cooling fluid imparts heat to the oil, thus promoting a reasonable viscosity in the lubricant, whilst under conditions of prolonged high-speed running the heat balance tends to change over, thus preventing any excessively high oil temperature without involving the use of a separate external oil cooler. The crankshaft is fully counter-weighted, and damped torsionally by a disc at the front end, which is rubber bonded on to a pressing of slightly larger diameter, which, in turn, is connected to the fan-belt pulley.

Other interesting constructional features of the engine are the use of a Bristol designed and made disc-type air filter and silencer, to which are connected the breather pipes of the engine, fumes being absorbed in this way, and the inlet-valve guides provided with a slight oil mist.

The engine, complete with dynamo, starter and fly-wheel, weighs only 353 lb. The derived figures of 4.15 lb. per h.p. and 179 lb. per litre both being exceptionally good, the latter particularly so on this size of power unit.

The clutch, which is a conventional single-plate type transmits the torque into a four-speed gearbox, which is again completely constructed by the Bristol organization; Synchro-mesh engagement is provided for all the upper three ratios, which have helical teeth, but it is interesting to observe that first gear has straight teeth. Moreover, the construction is such that when (and only when) first gear is engaged a free wheel is operative. It is thus possible to engage first gear instantly at any road speed, irrespective of engine speed and without necessarily touching the clutch pedal. This feature can be of particular importance, not only in trials work, but also under emergencies of mountain climbing and other extreme touring conditions.

CHASSIS DETAILS

The gearbox in itself is notable for having a centre main bearing, the casing being split vertically to

permit assembly, a feature rarely found on modern cars. The transmission embodies yet another interesting detail in the offtake shaft being internally splined, and the propeller shaft is mated to it, the splines thus being enclosed and running constantly in oil.

The bevel drive and rear axle casing do not in themselves call for any special comment, but the location of the axle on the frame and the rear suspension are special to this design of car. As neither leaf spring nor a torque tube is employed, it is necessary to locate the axle laterally and also to provide some means of driving the car. Both of these functions are embraced by a short triangulated link which has its apex on the bevel housing and terminates in two swinging bearings mounted on the rear end of the frame, a light and simple solution of an often difficult problem. The roll centre of the car at the rear is, of course somewhat higher than usual.

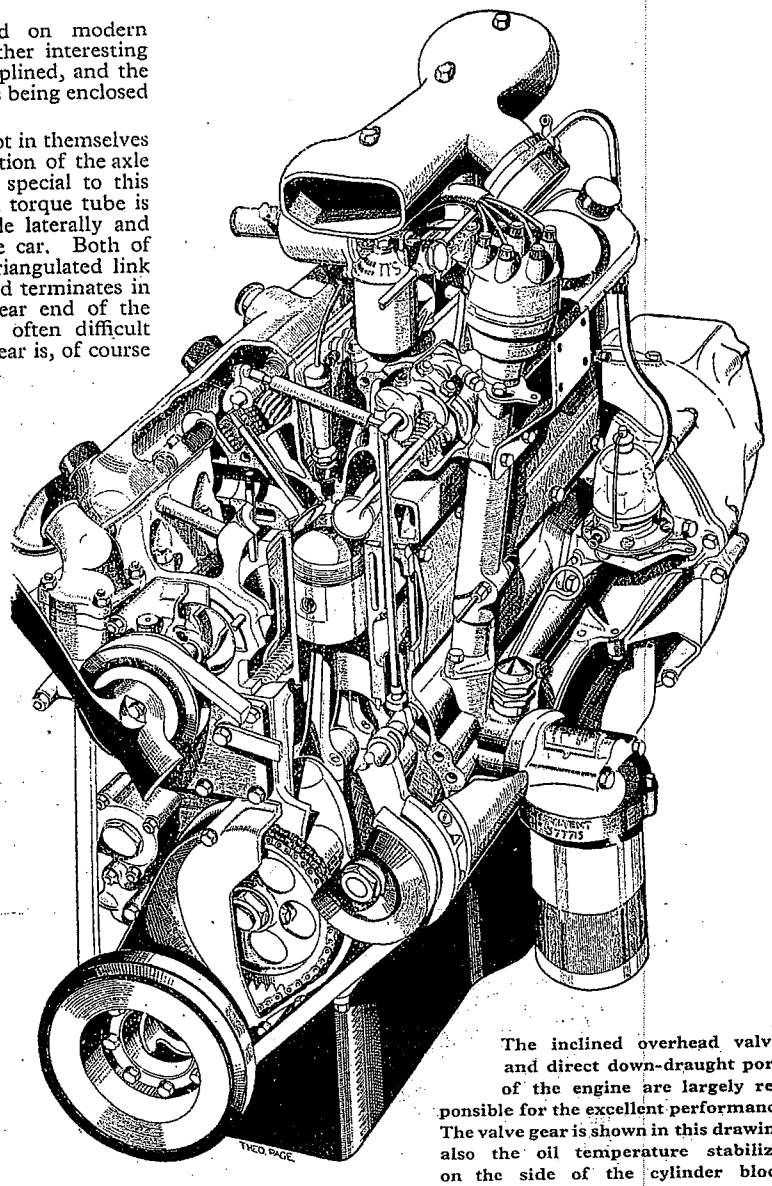
The rear suspension itself is by single arm on each side of the car connected to a torsion bar 0.805 in. in diameter and 59.4 ins. long, the remote anchorage of which is a splined member placed approximately in the middle of the frame.

The hydraulic shock absorbers, which are of piston type and of Bristol manufacture, are directly operated by the suspension arms. Similarly, dampers are incorporated in the front suspension, which consists of a pair of upper wishbones, the lower link being provided by a transverse leaf spring grooved for the dual purposes of weight and cost reduction.

The wheels are directionally controlled by rack-and-pinion mechanism, which is placed forward of the wheel centre. A fabric universal joint is interposed between the pinion and the steering column, thus isolating the latter from any slight distortions. The frame is, in point of fact, immensely stiff both as a beam and in torsion.

The side members, together with the front and rear cross members, are fully box sectioned, and although of only 14 gauge, the frame is 6.5 ins. deep over the centre section, and has two tubular cross bracing members at its mid-point. It is of interest that the main part of the frame stops short approximately 15 ins. ahead of the rear axle and has two light pressings extending backwards as body supports.

The installation of steering, engine and pedals is such that either right-hand or left-hand drive can be offered, the hand brake being centrally mounted. This connects to the rear wheels through rods in tension, the pedal operating a Lockheed system with two leading shoes.



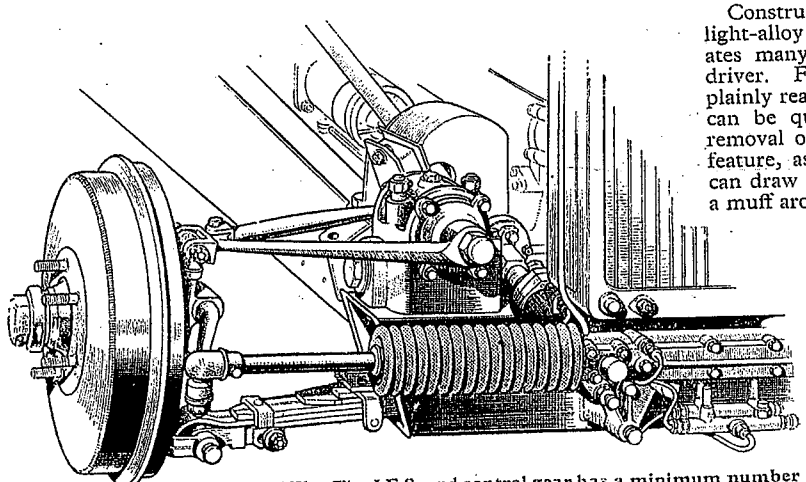
The inclined overhead valves and direct down-draught ports of the engine are largely responsible for the excellent performance. The valve gear is shown in this drawing, also the oil temperature stabilizer on the side of the cylinder block.

Specially designed electrical equipment is employed, including a starter in which a solenoid places the pinion in mesh with the flywheel before the starter motor is activated.

Constructionally, the body is of interest in the use of light-alloy panelling to reduce weight, and it also incorporates many features which will appeal to the enthusiastic driver. For example, speedometer and tachometer have plainly read circular dials, and the whole front of the panel can be quickly removed to expose the instruments for removal or service if required. A radio set is an integral feature, as is an electrically driven ventilating fan which can draw cold air from the nose of the car, or hot air from a muff around the exhaust pipe, at the choice of the driver.

The basic design is well-tried, and has behind it all the war-time experience of the Bristol Aeroplane Company with light structures and high-output internal-combustion engines, **experience which no other British firm can claim to possess over such a wide field.**

This is a car which, in respect of bodywork, chassis features and performance, should have an international appeal, and both A.F.N., Ltd., and the Bristol Aeroplane Company, Ltd., are to be congratulated on their initiative in getting it into production so quickly.



SIMPLICITY.—The I.F.S. and control gear has a minimum number of parts, direction being provided by a rack and pinion gear and suspension by a transverse spring grooved to reduce weight.

Specification

ENGINE 6 cylinders cast en bloc. Bore, 66 m.m. × stroke 96 m.m. Capacity 1,971 c.c. R.A.C. rating 16.2 h.p. Aluminium cylinder head with hard inserts for valves and sparking plugs. Inclined valves operated by special type of push-rod mechanism. Hemispherical combustion chambers. 10 m.m. sparking plugs. Pressed aluminium alloy pistons. Forged steel connecting rods of special section with oil feed from crankshaft to gudgeon-pin. Fully counterbalanced crankshaft with torsional vibration damper, four main bearings. Copper-lead (steel-backed) strip type bearings to all crankshaft journals. Water cooling with pump circulation, and pressure delivery to cylinder head. Water passes around full circumference of valves, guides and sparking plugs. Temperature regulation by thermostatically controlled radiator shutters. Forced lubrication to all engine bearings with full flow cleaner and oil heat exchanger in circuit. Triple down-draught S.U. carburettors with dry element type of air cleaner. Power unit flexibly mounted, allowing oscillation about an axis passing through its centre of gravity.

CHASSIS FRAME Rigid box-section, 6½″ deep, with four cross-members and integral rear floor structure. Body framework welded to chassis making an immensely strong unit.

TRANSMISSION Single dry-plate clutch and four-speed gearbox in unit with engine. Four speeds, freewheel operative on first gear, with synchromesh on second, third and top. All constant mesh gears have helical teeth. Split aluminium casing with centre bearing for main and layshafts. Dynamically balanced propeller shaft with sliding splines enclosed in gearbox extension, giving perfect lubrication and long life. Spiral bevel final drive, ratio 3.9 to 1.

SUSPENSION The front wheels are independently sprung, the design employing a transverse leaf spring. Rear suspension by torsion bars; the rear axle being located by a wishbone link mounted on rubber bushes. Hydraulic shock absorbers of special design are employed on the front and rear suspensions.

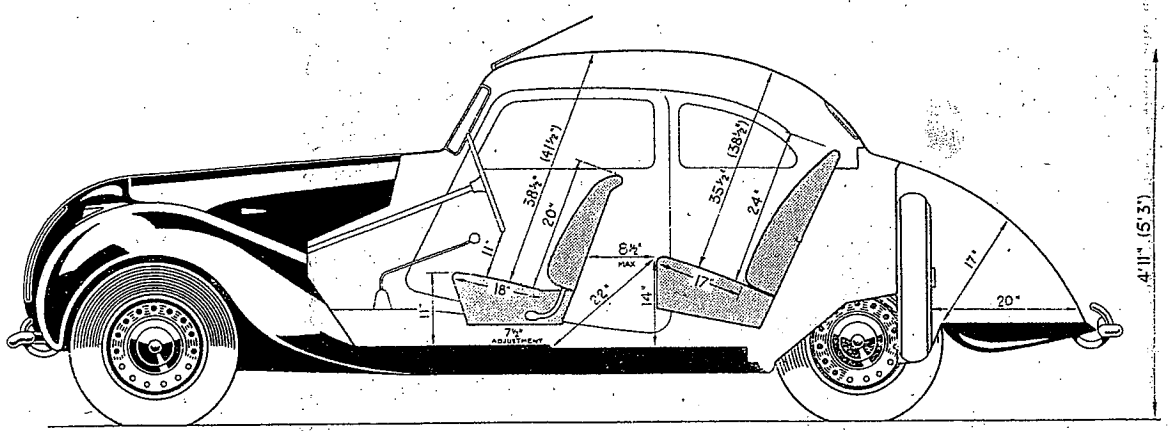
STEERING AND BRAKES Rack and pinion—front wheels are independently steered. Left-hand, or right-hand, steering. Hydraulic brakes on all four wheels (11″ diameter) two leading shoe type, with hand brake on rear wheels only.

EQUIPMENT, ETC. Specially designed 12-volt electrical equipment. 'Bolt-on' disc wheels, 5.50″ × 16″ tyres. 'One-shot' chassis lubrication system by foot-operated pump. Instruments: 5″ diameter speedometer, 5″ diameter tachometer, fuel gauge, oil and water thermometer gauges, ammeter and clock.

GENERAL DATA 85 B.H.P. at 4,500 R.P.M. Maximum revs. 5,000. Top gear m.p.h. per 1,000 R.P.M.—19.5. Top gear m.p.h. at 2,500 ft./min. piston speed—77.5. Gear ratios: 1st, 16.77; 2nd, 8.48; 3rd, 5.07; top, 3.9. Wheelbase 9′ 6″. Track (front), 4′ 3¼″. Track (rear), 4′ 6″. Overall length 15′ 3″. Overall width 4′ 11″. Petrol consumption 26 m.p.g.

PRINTED IN ENGLAND.

1947



WHEELBASE 9' 6"

★ DIMENSIONS *of the* **BRISTOL 2-litre**

Note: The figures in brackets are those for the Cabriolet Model where they differ from the Saloon Model.