SALES-FEATURES

MERCEDES-BENZ
280 S · 280 SE
300 SEL
300 SEL 6.3

Daimler-Benz Aktiengesellschaft Feb. 1969

Best intermediate sedan

CAR and DRIVER

In 1968, the fifth reader's survey arranged by the American motoring journal "CAR & DRIVER" Mercedes-Benz vehicles again scored a victory as in the previous year. With 35.4 % of the votes, the type 250 S/SE was chosen as the "best intermediate sedan".

Best allrounder

modern motor

Ahead with 22 % of all votes cast, the Mercedes-Benz types 250 S–300 SEL won first place in the highly competitive category "best allrounder" which was a matter of the best value for the money.

We do not want to list all the prizes that have been awarded to our 250 S–300 SEL models, but there are many of them. This shows that Mercedes-Benz customers around the world are satisfied with their vehicles.

Then what is the purpose of this booklet?

We are well aware of the fact that many sales openings are simply not used to advantage because some salesmen do not have sufficient knowledge of the details to enable them to convince their prospective customers.

One can only discuss something one knows thoroughly. To give this knowledge in the form of a comprehensive survey, which is also easy to understand, is the aim of our SALES FEATURES.

Daimler-Benz Aktiengesellschaft
Stuttgart-Untertürkheim

ARE YOUR ARGUMENTS GOOD?

Modern technology

- Engines built for high continuous speeds with oil cooling, armoured valve seats, sodium-filled valves, molybdenum-coated piston rings and many other advanced constructional elements.
- Exact preparation of the fuel-air mixture through the injection or carburettor system.
- Automatic viscosity coupling as standard.
- Sturdy chassis with individually located and suspended wheels.
- 4 hydropneumatic single tube dampers (operating with oil and gas!).
- Extremely wide high-performance tires with good side stability.
- 4 disc brakes with servo unit, dual-circuit system, brake pressure control, brake torque compensation (with 300 SEL and 300 SEL 6.3).
- Diaphragm clutch with automatic adjustment.
- Automatic level control by compensating spring (or by air suspension).
- First class air suspension (for 300 SEL and 300 SEL 6.3).

High standard of craftsmanship

- MB vehicles are outstanding for perfection in detail; high proportion of hand-finishing.
- Thorough training of apprentices in Daimler-Benz apprentice workshops. Approx. 1,000 apprentices complete their 3½ year course every year.
- Highly developed inspection system.

Dynamic performance

- In 10.5 seconds the 280 SE reaches 62 mph from a standing start (standard transmission). The power-to-weight ratio is 18 lbs/gr. HP.
- Fast and powerful acceleration from the lower and medium speed ranges.
- Reliable power reserves for overtaking.
- The automatic transmission, too, makes for fast and sporty driving.

Superior roadholding

- Perfect chassis with long wheelbase, wide track, extremely wide tires, disc brakes, independent wheel suspension etc.
- Even in critical situations the vehicle does not behave unpredictably.
- Good feel of the road.
- High average cruising speeds even on poor and winding roads.

Maximum comfort

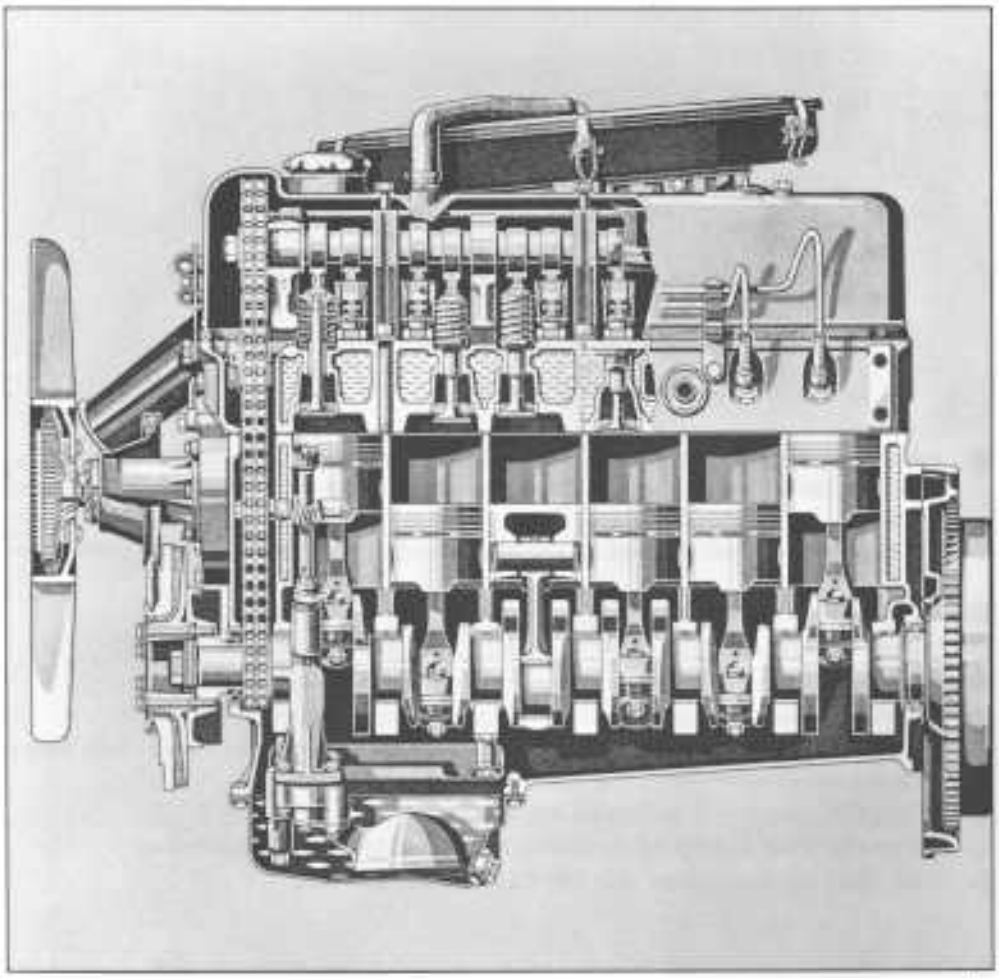
- Spacious interior with compact external dimensions.
- Anatomically shaped seats, breathing seat cushions.
- Draught-free constant ventilation and infinitely adjustable heating.
- Multiple insulation of the passenger compartment against noise and vibration.

Functional interior layout

- All instruments are clearly arranged and within easy reach of the driver, making for fatigue-free driving and alert reaction.
- Combination switch for different functions.
- The interior incorporates numerous features designed to protect the passenger in the event of an accident. Daimler-Benz is regarded as leading in the field of accident research.

Lasting value

- Long service life through high-quality material, thorough workmanship and careful quality controls.
- Mature, timeless design free from fashion fads, infrequent model changes.



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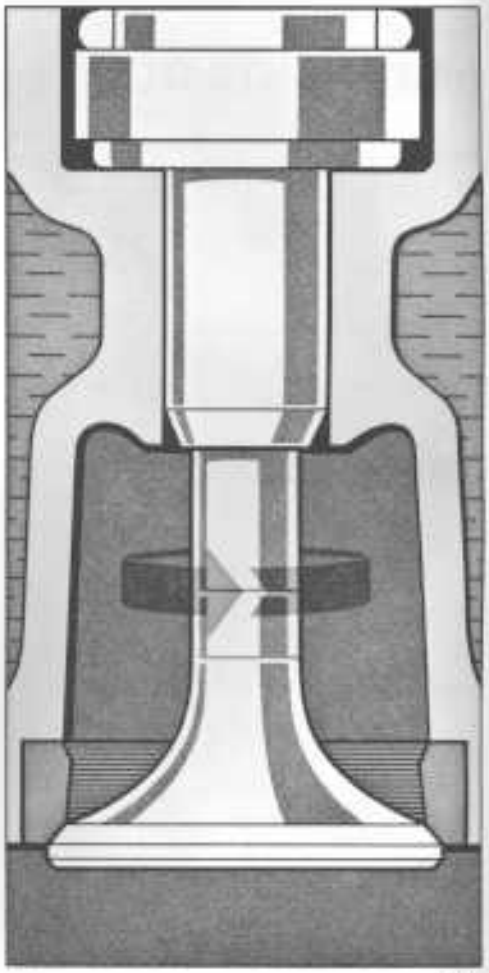

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Carburettor engine for the type 280 S

Characteristic features

157 gr HP/SAE (140 HP/DIN), torque SAE: 181 ft. lbs. (25 mkp) DIN: 165 ft. lbs. (22.8 mkp), 115 mph (185 km/h). Overhead camshaft. 7 crankshaft bearings. 2 twin barrel down-draft carburettors with automatic starting unit. Air-oil cooler mounted next to the radiator. Automatic visco-drive fan. Alternator. Molybdenum-coated piston rings. Maintenance-free valve rotating device "Rotocap". Valve seat rings. Sodium-filled valve stems. Armoured valve seats (fig. 1).

This engine has been included in the programme since January 1968; it is a completely new development based on the 250 S engine.

Essential differences to the 250 S engine: Even cylinder spacing. Circumferential cylinder cooling through milled channels in the zones of thermal stress in the upper cylinder block. New crankshaft. New cylinder head with new camshaft.

Important sales features

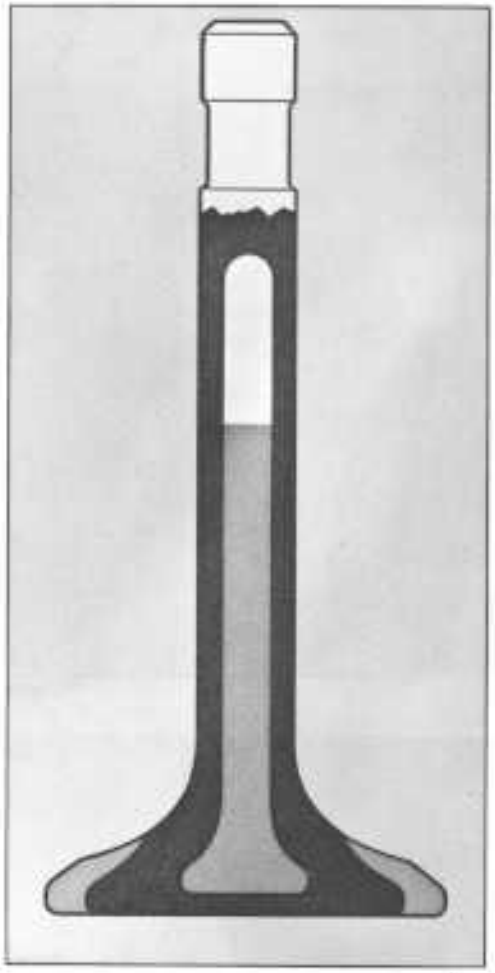
● **Advantages as compared with the 250 S model**

– **More power**

The extra 11 gr. HP/SAE (10 HP/DIN) of the 280 S engine are very noticeable, especially in the lower and medium speed ranges, through the increased pulling power. The new camshafts with modified timing, improve the cylinder filling and thus the torque, which makes the 2.8 litre engine even more flexible than the 250 S engine. The high torque is available at low engine speed, which means powerful acceleration without too much gearshifting. The gradient ability, too was increased (e. g. from 31 % to 35 % in 2nd gear).

– **Increased speed**

Apart from the increased maximum speed and more powerful acceleration, 0–62 mph (0–100 km/h) = 12.3 seconds, speeds within the individual gears can be better utilized, thus providing additional power reserves for overtaking and higher cruising speeds.



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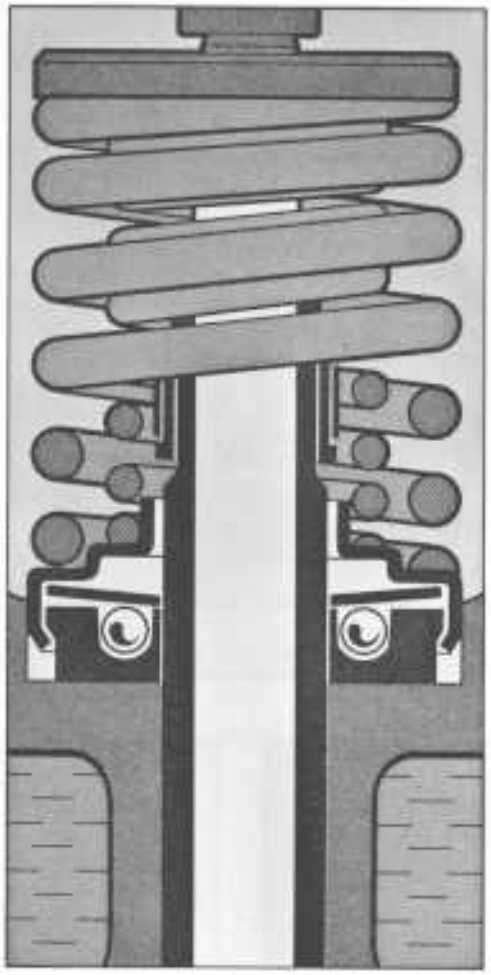

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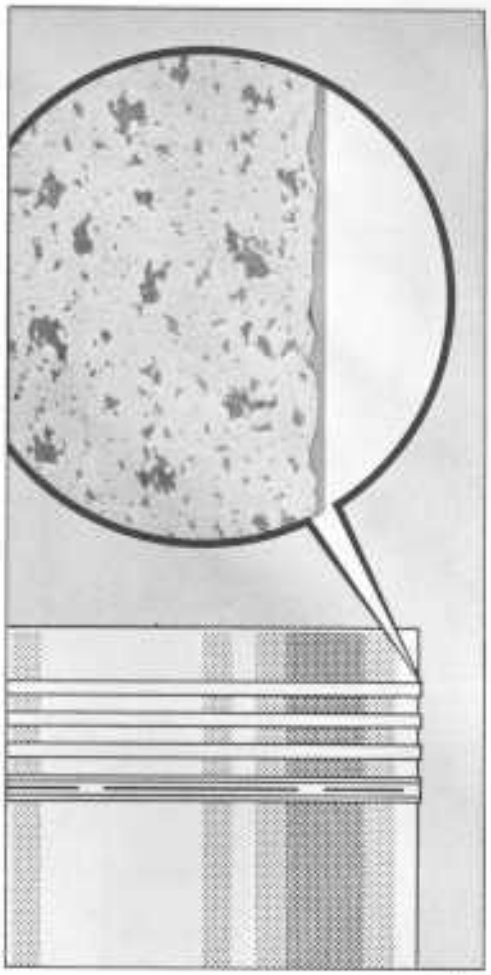

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● **High continuous speeds without heating and mechanical problems**

– With an **even cylinder spacing** every cylinder has circumferential cooling (fig. 9). Since the upper part of the cylinder block is subject to higher thermal stress during the combustion process, a cooling circuit has been built into this zone by milled channels, which together with the conventional cooling system guarantees constant heat dissipation even at hour-long maximum speeds.

– Intensive cooling of the engine oil by means of an **air-oil cooler** (fig. 7). As you know, the oil circuit does not only serve to lubricate, but also to dissipate the heat from the engine bearings.

– Even under extreme operating conditions, **molybdenum-coated piston rings** guarantee a trouble-free lubrication of the cylinder liner and prevent seizing. Molybdenum is very expensive, but it possesses ideal properties for piston rings. It is hard, extremely heat-resistant and, due to its porous surface, retains oil very well (fig. 5).

– **Maintenance-free valve rotating device** "Rotocap" avoids burnt spots between valve seat and valve disc (fig. 2).

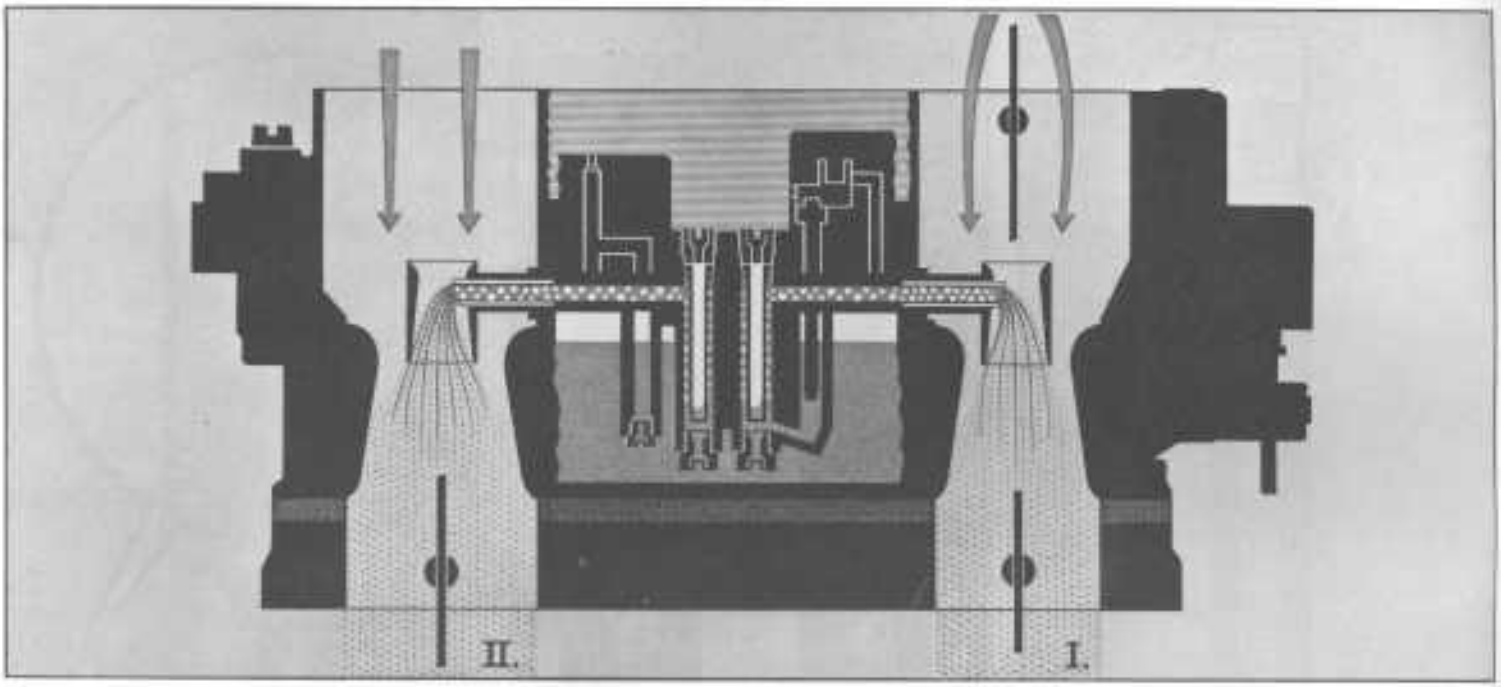
– **Armoured valve seats**

(fig. 3, red, schematic.) made of the expensive and heat-resistant Nimonic.

– **Sodium-filled exhaust valves** reduce the high thermal stress on the valve seat. At operating temperature the sodium becomes fluid in the hollow valve stems and due to its shaking motion transfers the heat from the hot valve disc to the cooler stem (fig. 3). Valves that are too hot tend to favour premature ignition, knock the engine etc.

– Each valve is equipped with **2 valve springs** (fig. 4) making for improved vibration characteristics and increased safety. If one spring does not function any more, the second spring keeps the valve in working order.

– **Valve seat rings** made of a high-quality chromium-nickel-molybdenum alloy also increase the wear resistance of the engine (fig. 2).



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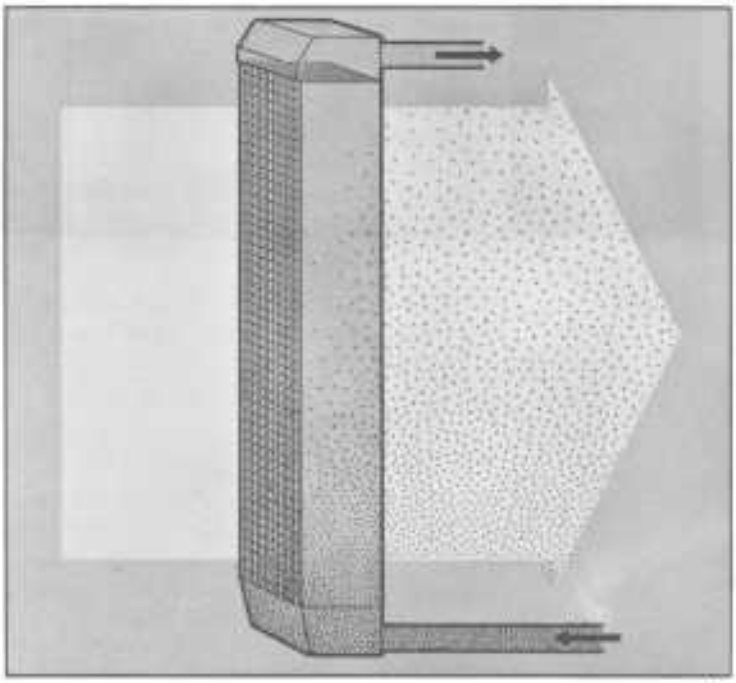

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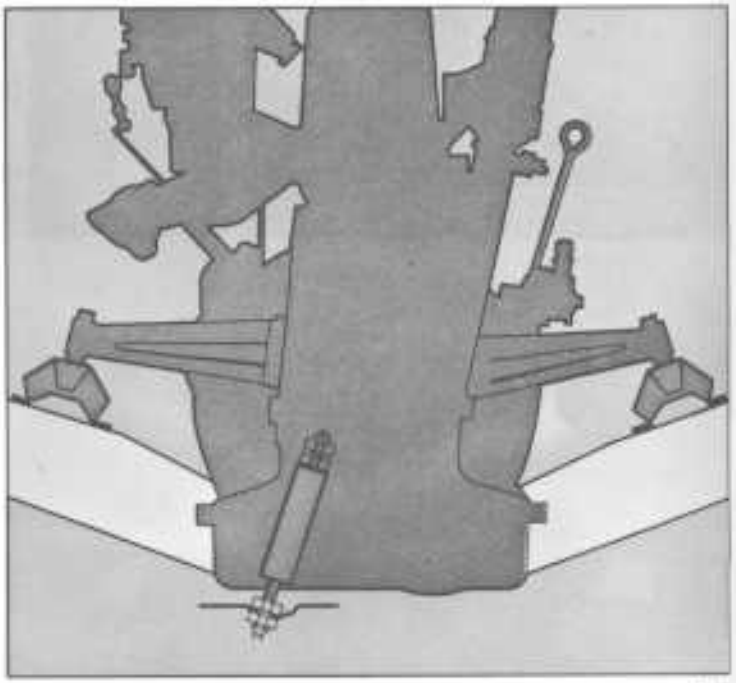

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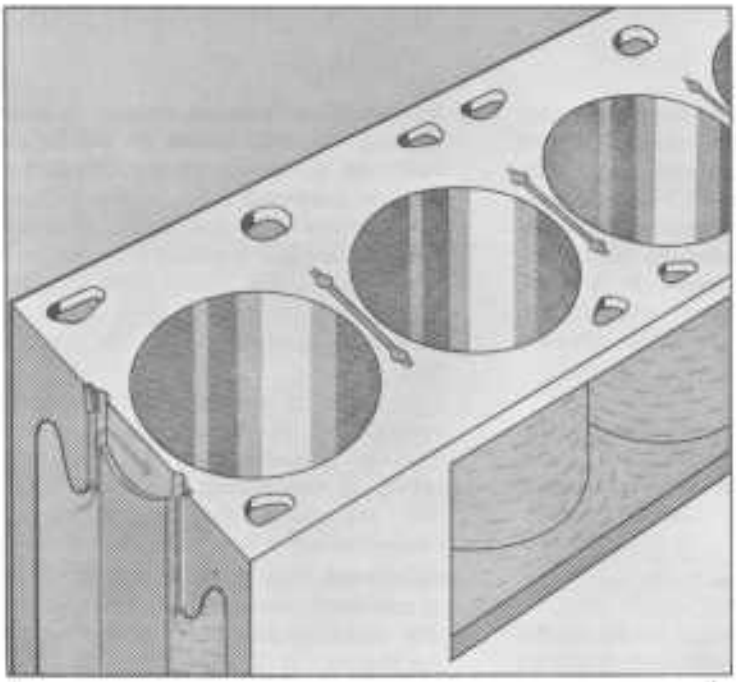

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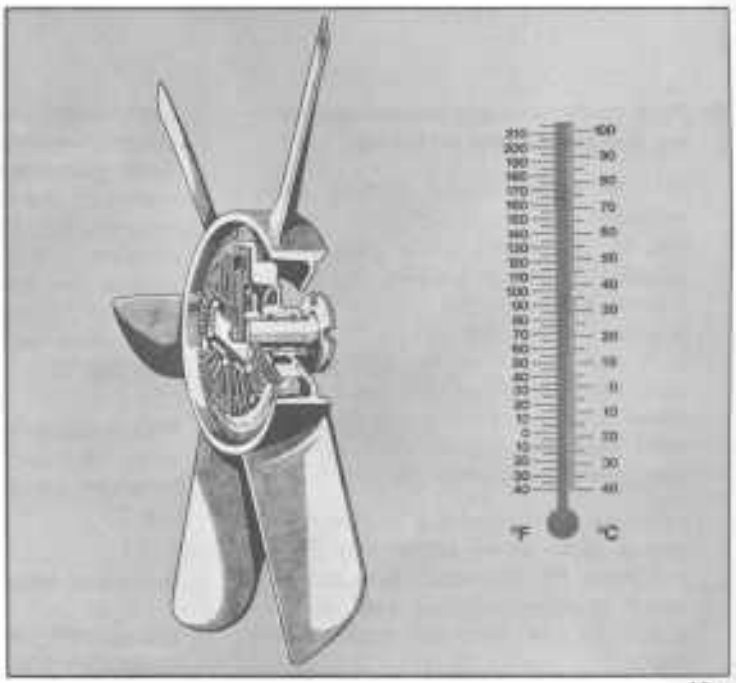

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– The **overhead camshaft** is made of the expensive malleable iron which is well known for its durability.

● **Powerful acceleration**

The 280 S reaches 62 mph (100 km/h) in 12.3 seconds from a standstill. Besides many other factors, such as optimum valve control by overhead camshaft, this powerful acceleration is due to the characteristics of the two twin-barrel down-draft carburettors. In principle, both of them consist of two carburettors lying next to each other. At low and medium engine speeds, only the first-stage throttle valve which is connected to the accelerator pedal, is opened. As soon as a certain suction pipe vacuum is reached, the second-stage throttle valve is opened automatically, resulting in high output at favourable fuel consumption (fig. 6).

In the Mercedes the second throttle valve is opened only – even with the accelerator pedal floored in the low speed range – if there is sufficient underpressure in the suction pipe, i. e. if the engine really needs the second barrel.

● **Large power reserves**

Should fast overtaking be necessary, the Mercedes has high power reserves. The 280 S completes an overtaking manoeuvre from 50–62 mph (80 to 100 km/h) in 3.4 seconds.

● **Quiet and smooth-running engine**

– The seven-bearing crankshaft guarantees a smooth and quiet operation of the engine in all speed ranges.

– Engines with overhead camshafts and valves make less noise during the working process than push-rod engines.

– Hardly any vibrations are transferred from the engine to the passenger compartment. The engine is suspended in rubber bearings in the front axle support, which is again insulated from the body by two additional rubber pads.

– An additional shock absorber between engine and frame (fig. 8) prevents engine vibrations from being transferred to the passenger compartment (e.g. when driving on rough terrain, when braking etc.).

– The fan operates only if cooling is required – and even then only with a maximum speed of 3,500 r.p.m. In this way noise is greatly reduced as compared with fans which are driven at a fixed ratio to the engine speed.

● **The visco-drive fan cools only if necessary**

– The visco-drive fan does not operate under normal temperature conditions or at low speed. Only at a higher engine temperature is the fan switched on automatically; 3,500 r.p.m., in the maximum (fig. 10).

– Faster and better warming up of the engine reduces wear.

– Higher engine output.

– Considerable saving on fuel as compared with engines with fixed fan drive.

– The viscosity coupling is virtually non-wearing; it is maintenance-free since there is no mechanical contact between friction surfaces.

INJECTION ENGINES TYPE 280 SE/300 SEL

Characteristic features

280 SE: 180 gr. HP/SAE (160 HP/DIN), torque SAE: 193 ft. lbs. (27.6 mkp) DIN: 177 ft. lbs. (24.5 mkp). 118 mph (190 km/h).

300 SEL: 180 gr. HP/SAE (160 HP/DIN), torque SAE: 193 ft. lbs. (26.7 mkp) DIN: 177 ft. lbs. (24.5 mkp), 115 mph (185 km/h).

280 SE and 300 SEL: Overhead camshaft. 7 crankshaft bearings. Intermittent suction pipe injection. 6-plunger injection pump with automatic starting and warming-up unit. Air-oil cooler mounted next to the radiator. Automatic visco-drive fan. Alternator. Molybdenum-coated piston rings. Maintenance-free valve rotating device "Rotocap". Valve seat rings. Sodium-filled valve stems. Armoured valve seats.

Included in the programme since January 1968. Completely new development on the basis of the 250 SE engine. The 3 litre, light metal engine has not been built any more since January 1968. The type 300 SEL is powered with the 2.8 litre engine.

Important sales points

● **Differences between the 280 S and 280 SE**

– **Even more power**
In spite of the same engine characteristics, the injection system provides greater power than the carburettor engine. The high torque of 26.7 mkp/SAE results from the improved cylinder filling. The customer will notice above all the increased flexibility and liveliness of the engine.

– **Even greater pulling power**
The 280 SE accelerates from 0 to 100 km/h (62 mph) in 10.3 seconds and is therefore faster than the carburettor engine which takes 2 seconds more.

– **Even better running characteristics**
Since the injection system automatically provides each cylinder with the exact mixture, the engine runs extremely smoothly.

– **Even more economical**
The injection pump supplies the exact quantity of fuel required for any given accelerator pedal position, engine speed, air pressure and cooling water temperature. The moment you take your foot off the accelerator pedal (overrun), no more fuel is injected; only when the engine is down to about 1,800 r.p.m., is injection resumed.

● **Differences between 280 SE and 300 SEL**

– **Higher unloaded weight**
Because of the extra 300 lbs. (135 kg) unloaded weight, the type 300 SEL is slightly slower than the type 280 SE. The higher unloaded weight is above all a result of the 3.9" (100 mm) longer wheelbase and the technical characteristics, such as the automatic transmission, power steering, air suspension and brake torque compensation on the rear axle.

● **High continuous speeds**

The 2.8 litre engine is modern and progressive in design. Maximum speeds driven over any length of time do not cause thermal or mechanical problems because MB engines are designed

according to the latest findings of metallurgy. Their characteristic features include

- molybdenum-coated piston rings
- air-oil cooler
- maintenance-free valve rotating device "Rotocap"
- sodium-filled valves
- valve seat rings
- armoured valves
- 2 valve springs per valve
- overhead camshaft of malleable iron
- automatic visco-drive fan

For further details please see page 5.

Intermittent suction pipe injection

Daimler-Benz was the first automobile manufacturer to use fuel injection – in 1954 in racing cars and as of 1956 in series-produced passenger cars. No other car company can boast such a wide knowledge in this field.

Injection methods

In principle, there are two different systems: the direct injection into the cylinder and the indirect injection into the suction pipe (fig. 12) as intermittent or continuous injection.

The direct injection method has been virtually abandoned.

With the continuous suction pipe injection fuel is continuously injected into the suction pipe and, on opening of the inlet valve, carried into the cylinder by the air flow (application: Tecalemit-Jackson unit available for installation; mainly for English vehicles). This constant mixing of fuel and air is very similar to the carburettor system.

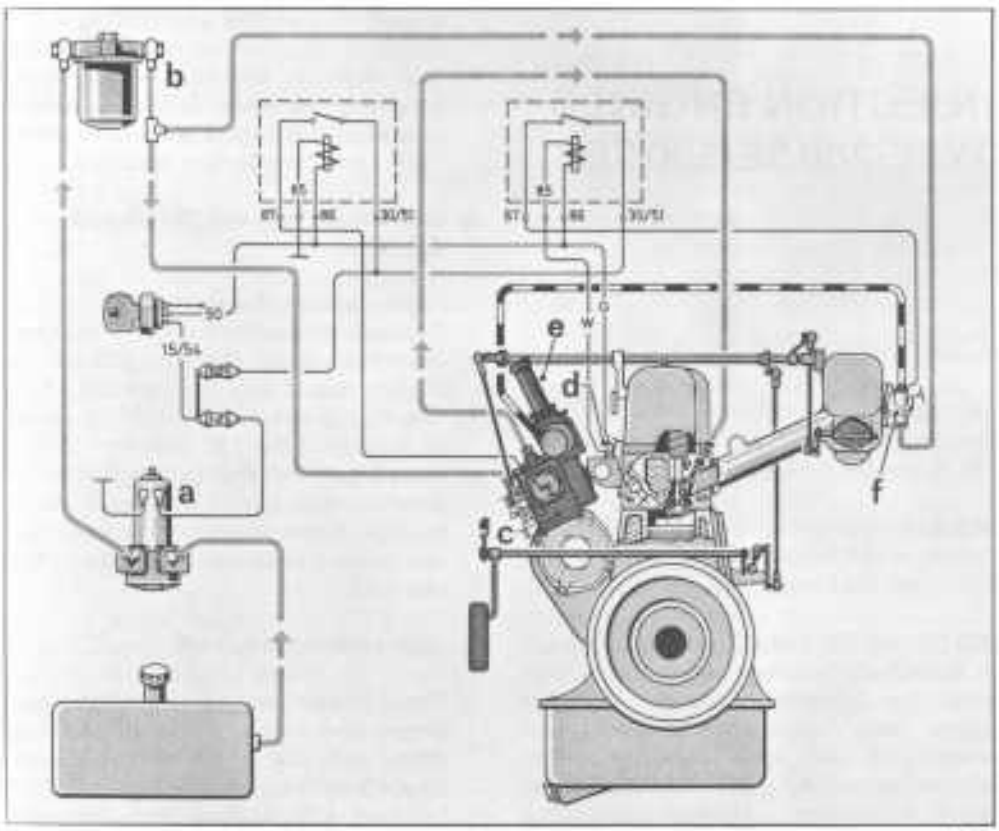
Mercedes-Benz uses the intermittent suction pipe injection.

Working method (fig. 11): An electric fuel feed pump (a) is actuated with the ignition, which, via a fine-mesh filter (b), feeds fuel from the tank to the engine-driven injection pump (c). This six-plunger pump with automatic starting and warming-up unit pushes the fuel, in six direct lines, to the six injection nozzles which are installed in the suction channels of the cylinder head (figs. 11 and 13).
On injection (coinciding with the suction stroke of the piston) part of the fuel is sprayed into the cylinder past the open valve, using heat for vaporization, thus making for additional cooling af the cylinder from inside. At the end of the compression stroke the mixture is burned by the ignition spark.

Mixture control

A special feature of the injection pump is the automatic adjustment to the accelerator pedal position, engine speed, air pressure and cooling water temperature, making for optimum mixture control in every driving situation. This process works as follows: The accelerator pedal operates a regulating linkage which is connected both to the adjusting lever (fig. 14, c) of the injection pump and to the throttle valve in the throttle housing of the suction pipe.

The injection pump is accurately controlled by means of a **spherical cam** (fig. 14, a), a disc with a built-in cam path (having height, depth and width = three dimensional) which is shaped in such a way that there is a fixed optimum amount



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of fuel to be injected for any given load of the engine.
The spherical cam is sliding and pivoted; it is horizontally adjusted by fly weights (fig. 14, b) depending on the engine speed. Radial adjustment is effected by an adjusting lever (fig. 14, c) which is connected to the accelerator pedal and throttle valve.

The surface of the spherical cam is scanned by a roller adjusting the control rod (fig. 14, d and 13, d) via a lever according to the load condition.

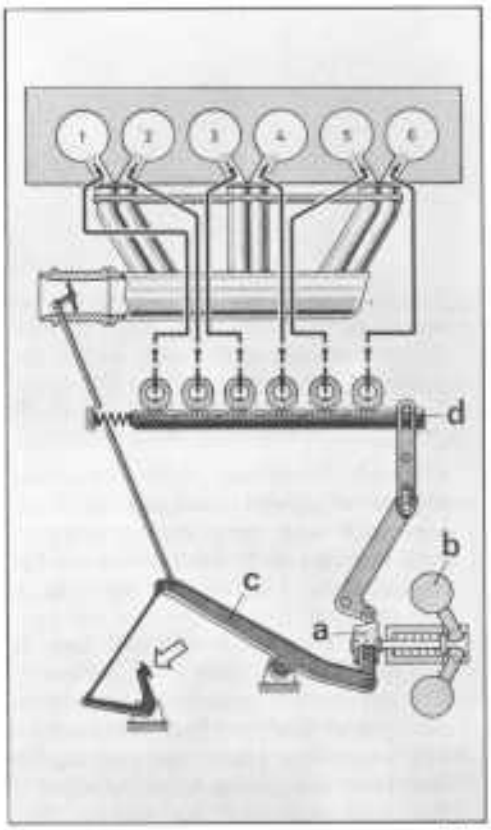
The **water cooling thermostat** (fig. 14, e) is linked with the water cooling circuit to ensure that the mixture is enriched to offset the higher frictional force and poorer fuel-air mixture in cold engines. When the engine gets warmer, the extra feed rate is continuously reduced and back to normal at a cooling water temperature of 149–158° F (65–70° C).

Built-in pressure cells (like those in the barometer) adapt the amount to be injected to the atmospheric pressure (fig. 14, f), ensuring a smooth operation of the engine when driving on high mountain roads.

On starting the engine, the automatic starting device controls the enrichment of the mixture in two ways. The magnet fitted to the injection pump together with the relay increases the feed rate of the injection pump when the ignition starter switch is operated. During every starting operation – also with a warm engine – the mixture is enriched, i.e. fuel is injected via the electromagnetic starting valve (fig. 11, f) directly into the suction pipe from the feed pump, by-passing the injection pump. This process is controlled by the relay and the thermal control switch (fig. 11, d) which opens the electromagnetic starting valve for 1–12 seconds (depending on the water temperature) at water temperatures of below 103° F (+ 35° C).

The injection system incorporates the following advantages over carburettor systems:

- Reduced fuel consumption through a precisely metered feed rate, no fuel injection on the overrun
- Increased flexibility in the lower speed range
- Improved torque through better cylinder filling
- Good cold starting properties
- Better exhaust gas control



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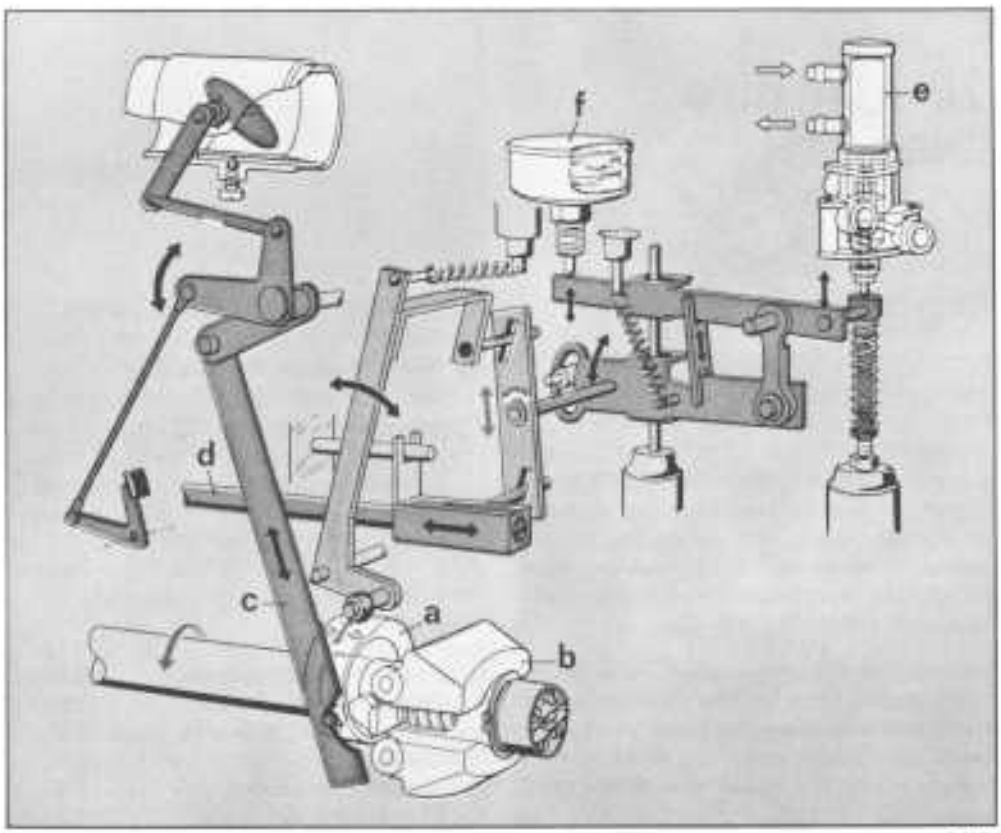

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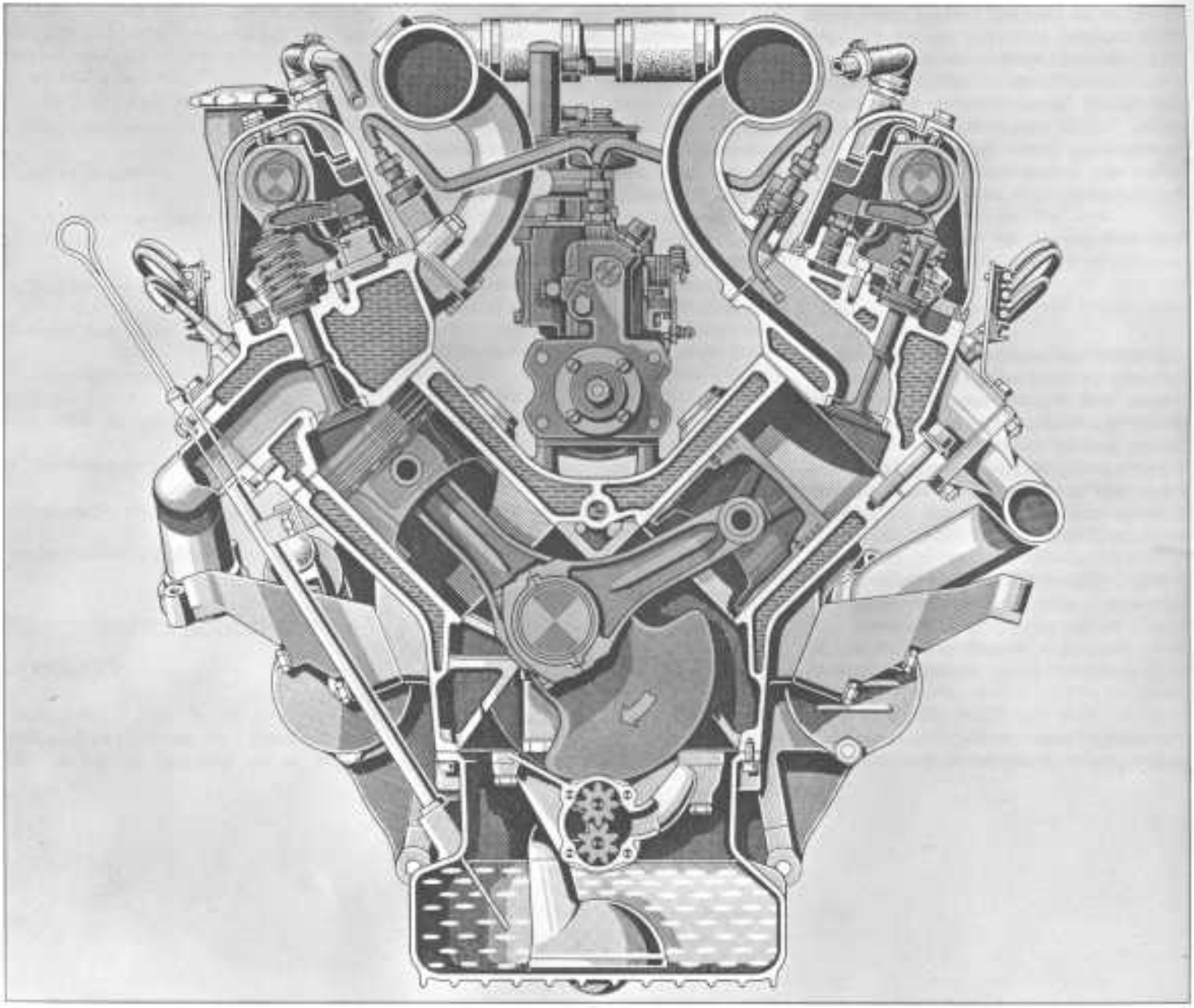

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V8-INJECTION ENGINE TYPE 300 SEL 6.3

Characteristic features

300 gr. HP/SAE (250 HP/DIN), torque SAE: 434 ft. lbs. (60 mkp), DIN: 369 ft. lbs. (51 mkp), 137 mph (220 km/h). 2 overhead camshafts. 5 crankshaft bearings. Intermittent suction pipe injection. 8 plunger injection pump with automatic starting and warming up unit. Oil-air cooler mounted next to the radiator. Automatic viscodrive fan. Alternator (fig. 15).

Included in the programme since March 1968. Apart from a few changes which have been necessary for installation in this particular chassis and body, the engine is identical with that installed in the type 600 since 1963.

Important sales features

- **Faster than most sports cars**
  The 300 SEL 6.3 takes 6.5 seconds to accelerate from 0 to 100 km/h (62 mph).

The most fascinating thing about this sedan is that any fairly experienced driver can fully and safely utilize the powerful V 8 engine without effort.

Please turn to pages 12-26 to see how intensely Daimler-Benz is concerned about chassis construction and how successful it has been. For years, the aggregates and parts used have been installed in the type 600 and the construction

DIFFERENCES

	280 S	280 SE	300 SEL	300 SEL 6.3
Cylinders	6	6	6	8
Cubic capacity (cu. ins.)	169.5	169.5	169.5	386.4
(ccm)	2,778	2,778	2,778	6,332
Induction	twin-barrel down-draft carburettors	6-plunger injection pump		8-plunger injection pump
Output (HP/r.p.m.)	SAE 157/5,400 DIN 140/5,200	180/5,750 160/5,500	180/5,750 160/5,500	300/4,100 250/4,000
Torque (ft. lbs./r.p.m.)	SAE 181/3,800 DIN 165/3,600	193/4,500 177/4,250	193/4,500 177/4,250	434/3,000 369/2,800
Acceleration 0–62 mph (sec)	12.3	10.3	11.3	6.5
Max. Speed mph (km/h)	115 (185)	118 (190)	115 (185)	137 (220)
Transmission	mechanical 4-speed gearbox, MB automatic on request		MB automatic	MB automatic
Suspension	steel suspension with hydropneumatic compensating spring		air suspension with automatic level adjustment	
Steering	MB recirculating steering, power boost optional		MB recirculating ball steering with power boost	
Wheelbase (inch)	108.3	108.3 (wheelbase 112.2 with power boost)	112.2	112.8
(mm)	2,750	2,750 (optional 112.2/2,850)	2,850	2,865
Empty weight (lbs.)	3,220	3,270	3,570	3,890
(kg)	1,460	1,485 (3,307/1,500 for wheelbase 112.2/2,850)	1,620	1,765

series 300, having proved their absolute reliability.

● **12.8 lbs./HP (5.9 kg) – SAE power-to-weight ratio**

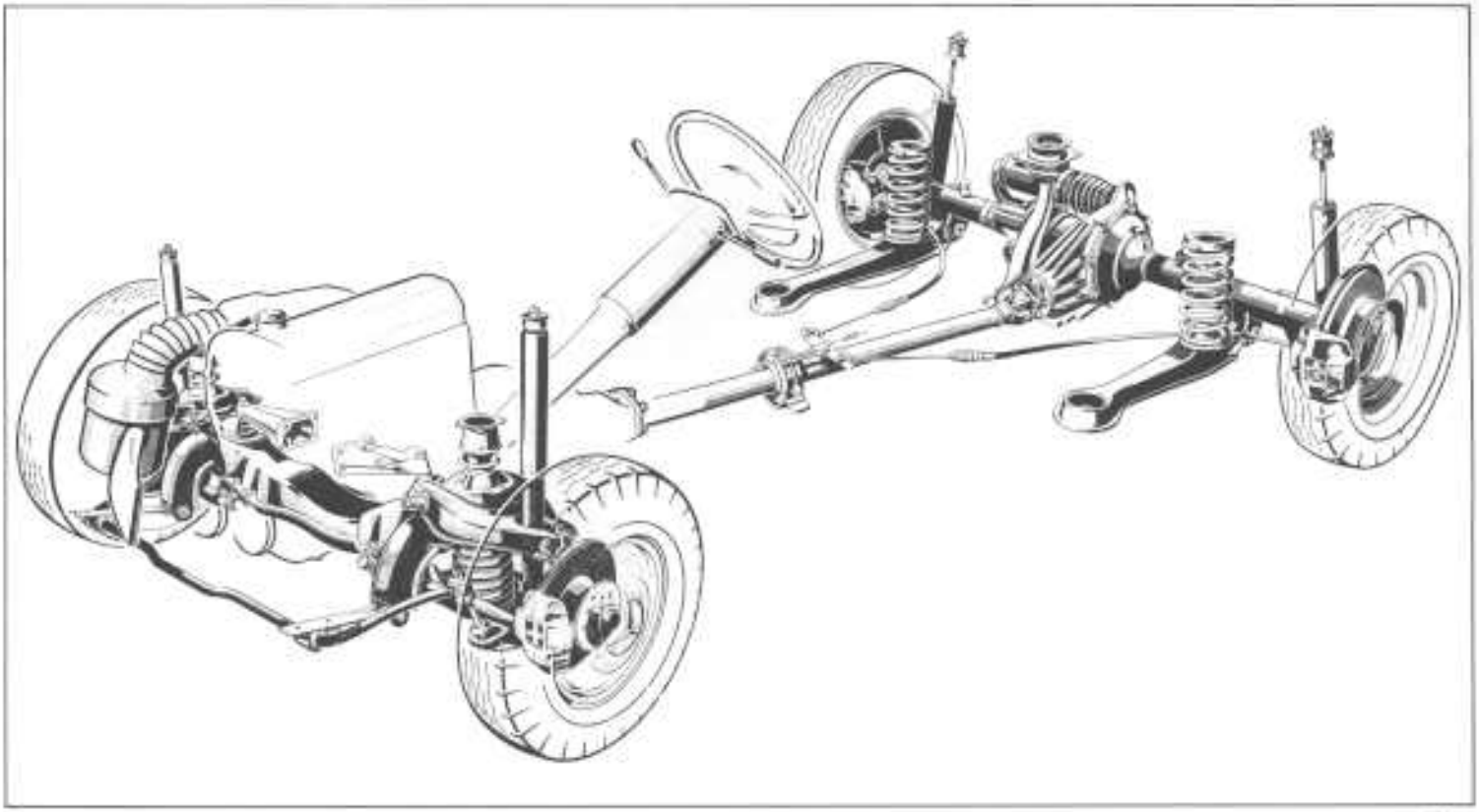
What are the advantages of the unusually high power-to-weight ratio of 5.9 kg/HP-SAE (7.05 kg/b.h.p.-DIN) in day-to-day driving?

In spite of the 3,890 lbs. (1.8 ton) heavy safety body, the 300 SEL 6.3 with its MB automatic accelerates faster than most sports cars. Passing manoeuvres are no longer risky when it only takes 6.5 seconds to reach 62 mph (100 km/h) and another 9.5 seconds to reach 93 mph (150 km/h). Speeds of over 130 mph (200 km/h) do not present any problems either, thanks to the strong and carefully designed chassis.

● **434 ft. lbs. (60 mkp) – SAE torque**

At 900 r.p.m. the torque already exceeds SAE 362 ft. lbs. (50 mkp), DIN 326 ft. lbs. (45 mkp). The V 8 engine reaches the maximum torque of 60 mkp-SAE (51 mkp-DIN) at 3,000 r.p.m. (2,800 r.p.m.-DIN). High speeds are attained with the greatest of ease saving both material and nerves.
Impressed how effortlessly one can control the enormous power of 434 ft. lbs. (60 mkp), one test driver called the 300 SEL 6.3 "the Swabian rocket".

Why does Daimler-Benz build this "unusual vehicle"? With the 300 SEL 6.3 we should like to meet the wishes of those customers who expect above-average driving performance, but do not want to buy an ultra-prestige limousine like the type 600.



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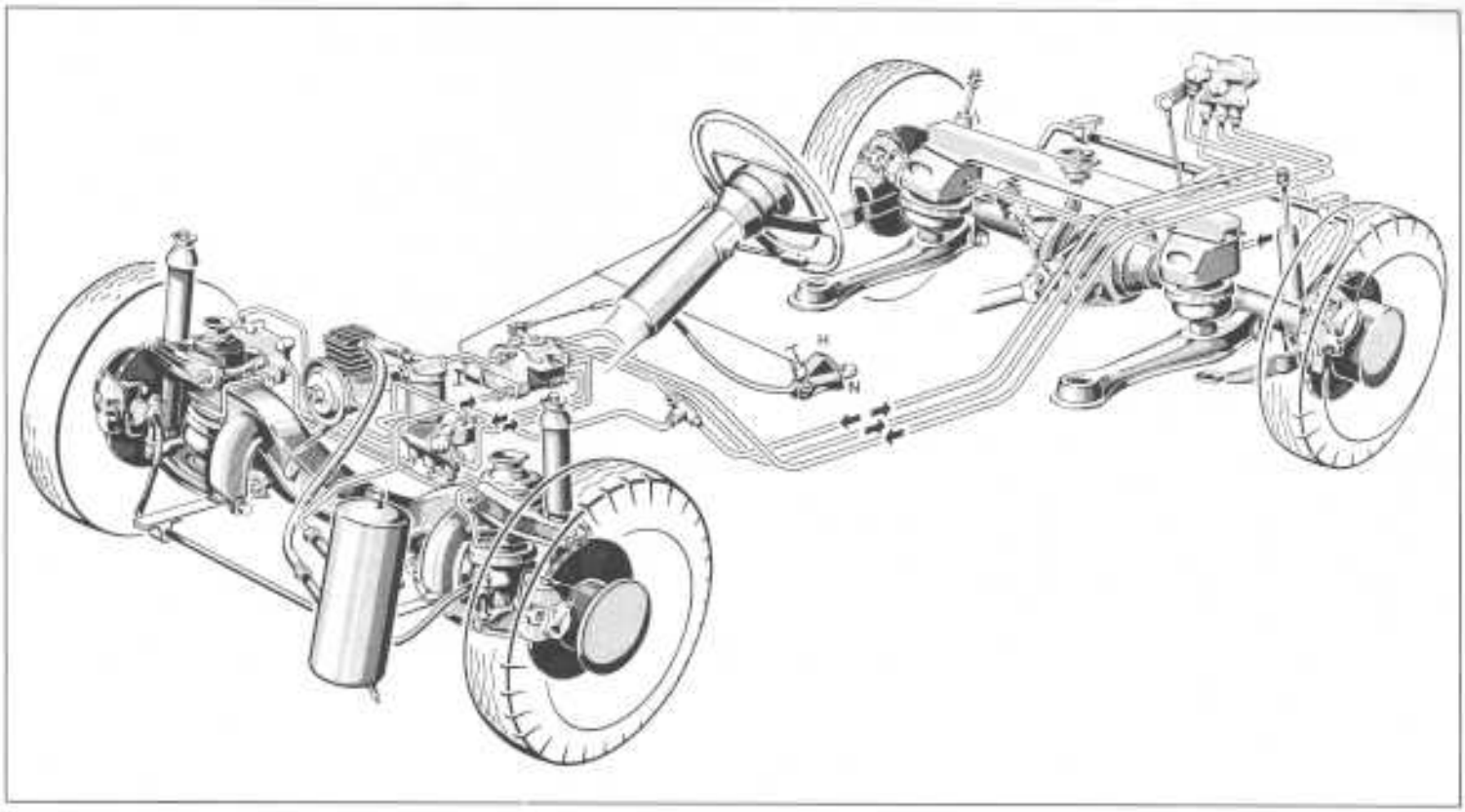
Chassis characteristics of the types 280 S, 280 SE

- Frame floor unit
- Wheelbase 108.3"/2,750 mm (optional 112,2"/2,850 mm with 280 SE)
- All 4 wheels individually suspended
  Front wheels by 2 triangular wishbones, rear wheels by supporting tubes of the single joint swing axle and thrust rods
- Steel suspension
  Coil springs with progressive-action rubber compensating springs, hydropneumatic single tube dampers
- Automatic level adjustment on the rear axle
- 4 disc brakes with power boost
- 2 independent brake circuits
- Brake pressure control
- Diaphragm-type clutch
- Mechanical 4-speed transmission
- MB recirculating ball steering with steering shock absorbers (MB power steering for the 280 SE with wheelbase 112.2"/2,850 mm)



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Chassis characteristics of the types 300 SEL, 300 SEL 6.3

- ● Frame floor unit
- ■ Wheelbase 112.2"/2,850 mm (300 SEL 6.3 112.8"/2,865 mm)
- ● All 4 wheels individually suspended
  Front wheels by 2 triangular wishbones, rear wheels by supporting tubes of the single joint swing axle and thrust rods
- ■ Air suspension consisting of air chambers and spring bellows, hydropneumatic single tube dampers
- ■ Automatic level adjustment on front and rear axle
- ● 4 disc brakes with power boost (internally ventilated with the 300 SEL 6.4)
- ● 2 independent brake circuits
- ● Brake pressure control
- ■ Brake torque compensation
- ■ MB automatic transmission
- ■ MB power steering with steering shock absorbers

Robust frame floor unit

As the name implies, the frame floor unit is the frame of the vehicle and simultaneously the floor of the body.
It is lighter than the conventional chassis frame and surpasses it in rigidity, since the body is of the self-supporting type. The saving on weight as regards the frame makes a robust construction of the other chassis elements possible.

Optimum roadholding

Mercedes-Benz vehicles are well-known for their high driving safety. This is not mere chance. Over many years of systematic research and testing, the independent location and suspension of all wheels has been perfected since neutral and safe driving properties can only be achieved through top quality and precision. Besides, the same men are responsible for our series-produced vehicles who built racing cars for Fangio, Stirling Moss and Caracciola.

As a rule, the customer is only interested in the fact that

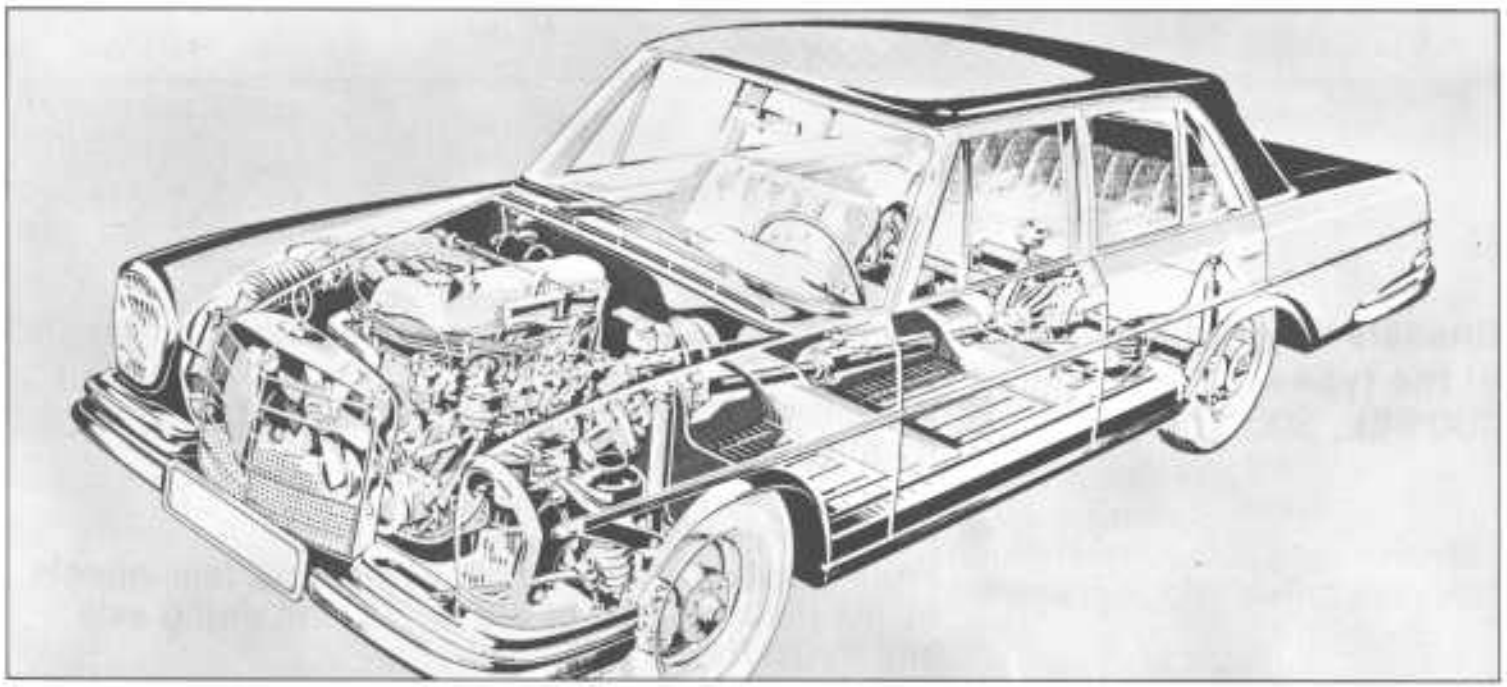
- in critical situations his Mercedes does not suddenly change its driving characteristics and does not act unpredictably;
- the vehicle lets him feel when he approaches the adhesion limit and gives him enough time to react properly;
- regardless of the road condition maximum driving comfort is guaranteed.

You should, of course, know why Mercedes-Benz vehicles are superior and we should like to give you the following brief outline.

Double wishbone front axle

The Mercedes-Benz is equipped with a front axle support, with each wheel mounted on two triangular wishbones (fig. 19).

The anti-roll bar prevents tilting of the body during cornering. As you can see from diagram 23, the anti-roll bar is pivoted and responds only if one front wheel moves counter to the other. The types 280 S/280 SE are provided with one anti-roll bar at front, the types 300



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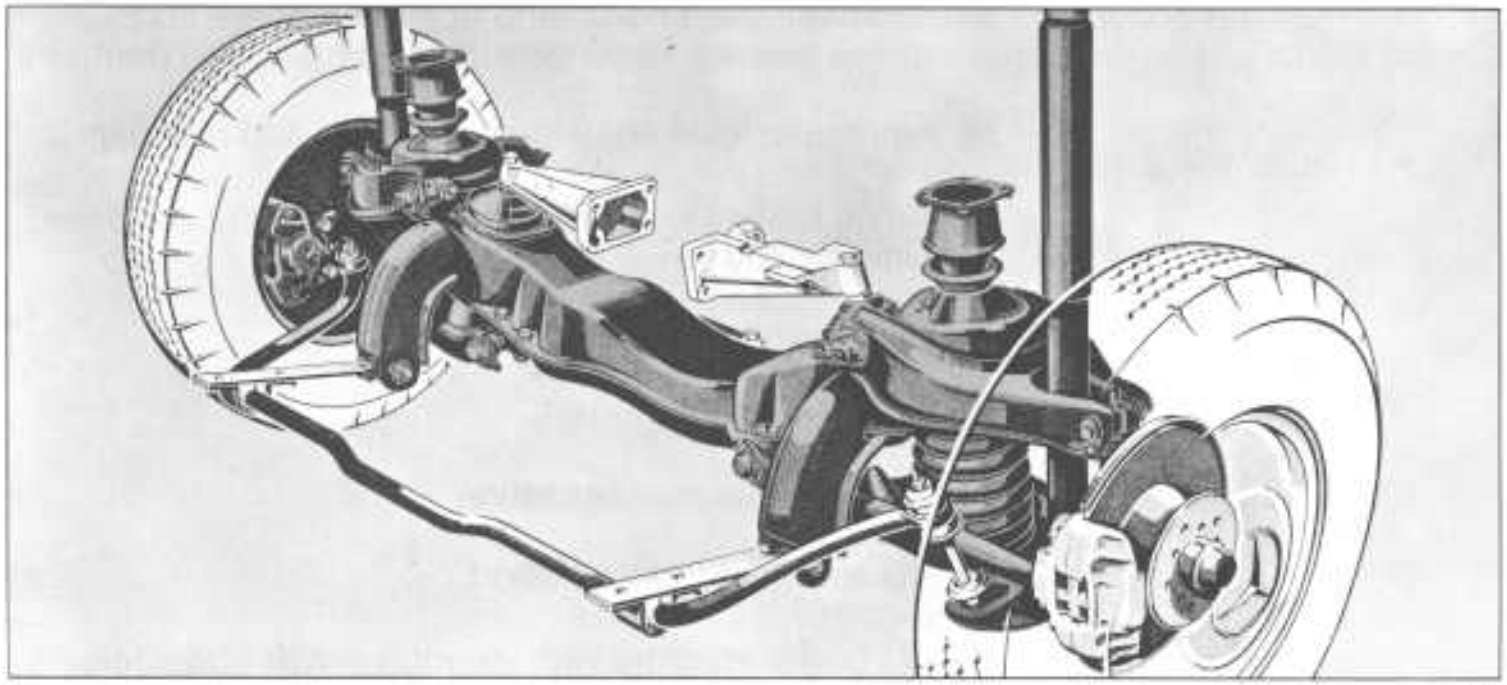

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SEL and 300 SEL 6.3 with an anti-roll bar at front and rear.

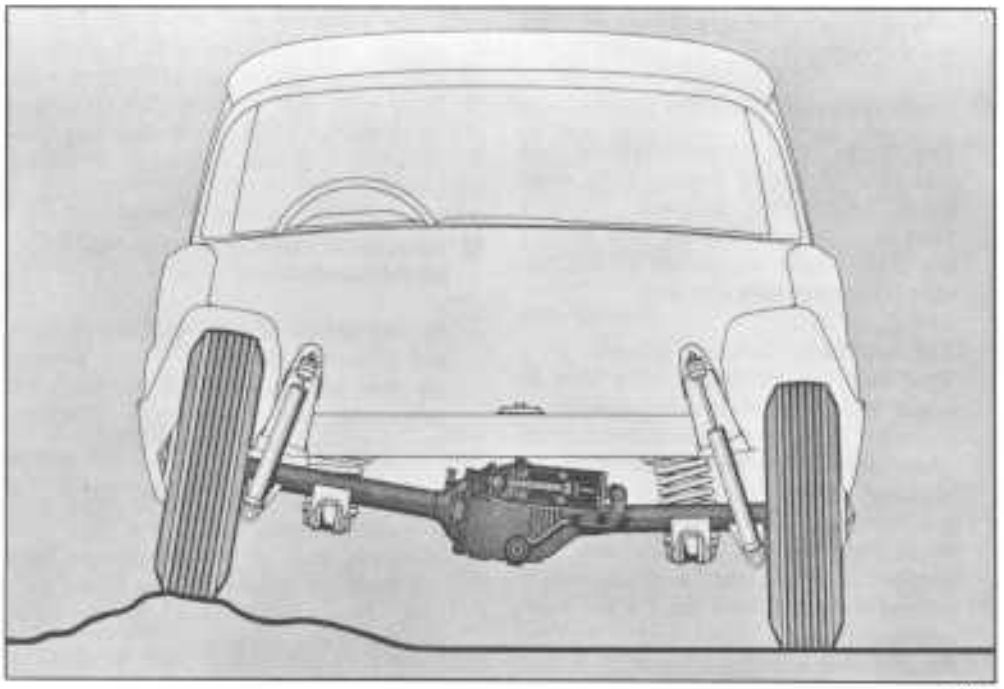
As the V 8 engine of the 300 SEL 6.3 required more room the installation assembly of the front axle support had to be modified resulting, among other things, in a longer wheelbase.

Rubber pads insulate against noise and vibrations

The car body and the passengers must be protected against noises and vibrations from the road and drive unit. This is effected by numerous rubber pads.

For example, the engine rests on rubber pads in the front axle support, which in turn is suspended in soft rubber mounts on the frame floor unit. The same applies to the rear axle. Rubber as insulating material is also used for the mounting of shock absorbers and coil springs.

The insulation between the chassis and body is so effective that radial-ply tires do not, even at low speeds, impair the driving comfort to any marked degree.



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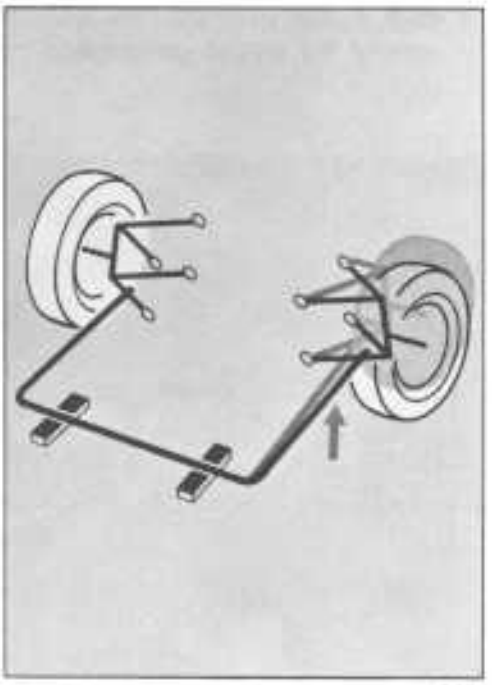

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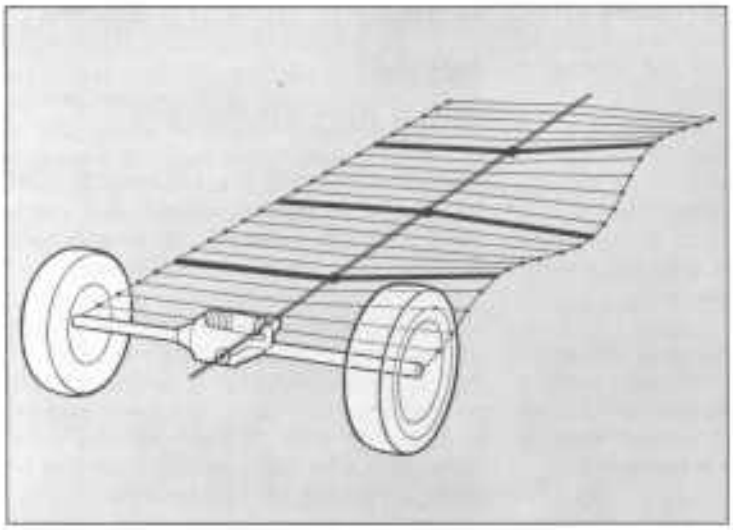

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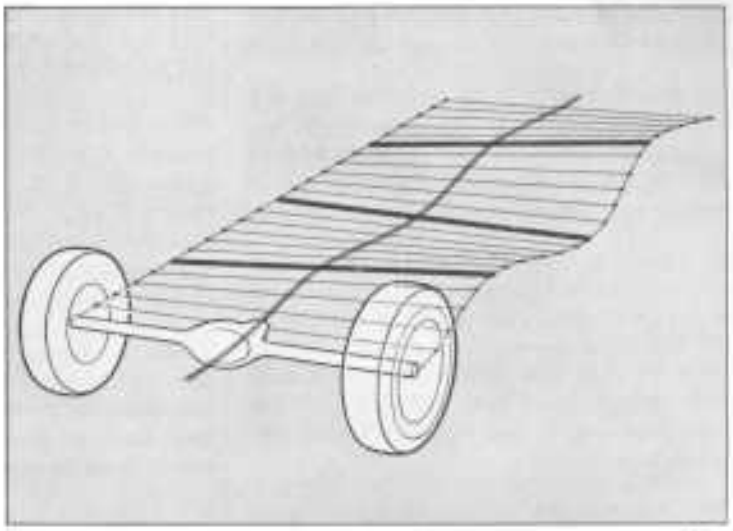

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MB single joint swing axle

The differential is fixed to the left axle tube (fig. 20). The right axle tube is connected to the differential via a universal joint.

Because of the higher stress, the rear axle of the 300 SEL 6.3 is reinforced and partially made of different material.

To reduce the oil temperature in the rear axle, an oil cooling tube is mounted to the casing.

The MB single joint swing axle affords the customer noticeable advantages:

- **Comfort and safe roadholding**

  The light axle halves adapt themselves very well to the unevenness of the road, therefore guaranteeing good road contact in all speed ranges. For the customer that means high driving comfort and good roadholding.

  With rigid axles, the unsprung masses of the differential, the drive shaft and the axle body move together with the wheels. These large masses are much too inert to follow the unevenness of the ground completely.

- **High curve stability**

  The driver of a Mercedes-Benz can maintain his sporty driving style even when negotiating corners. Through their negative camber the rear wheels are particularly supported in curves, with increased side stability.

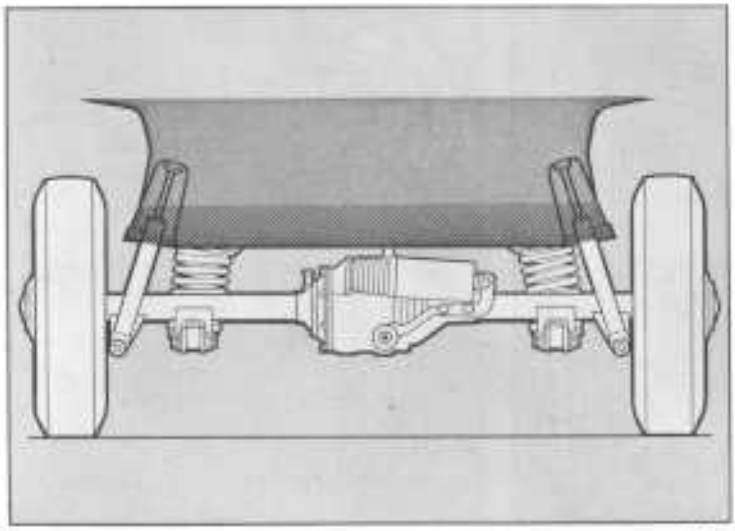
- **Directional stability through exact wheel suspension**

  Spring action of one rear wheel does not influence the other at all. Whereas the one wheel follows the unevenness, the other runs independently straight ahead (fig. 24).

  As can be seen in fig. 25 even with one-sided spring action the rigid axle transfers part of the vibrations from the yielding wheel to the other axle half, thus influencing the straight course of the vehicle.

- **Favourable centre of gravity**

  As you can see from fig. 26, the differential of the single joint swing axle



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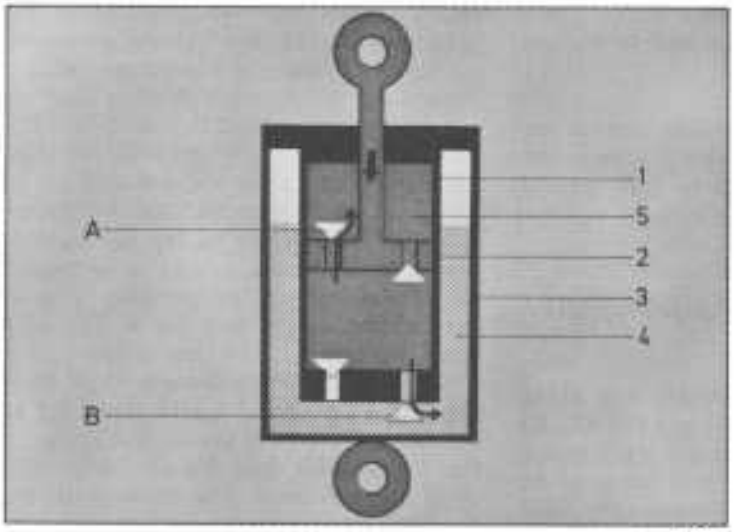

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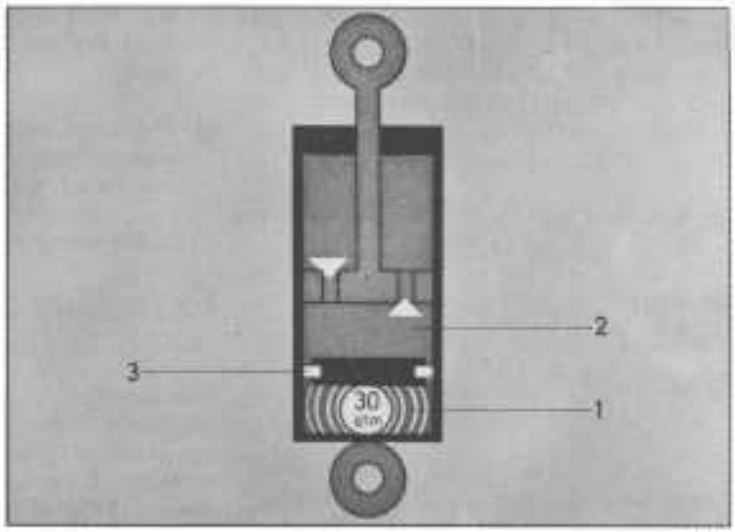

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does not follow the movement of the rear wheels – it is connected with the frame floor unit, forming the neutral zone of the rear axle.

Since with the rigid axle the entire differential follows the spring action, then, assuming a spring deflection of 6" (15 cm), a space of 6" (15 cm) above the differential must be kept free. This "dead travel" does not only flatten the trunk and therefore reduce the space available, but is also disadvantageous to the vehicle's centre of gravity, i.e. to the overall driving characteristics (fig. 27).

Automatic level adjustment as standard

With increasing load on the rear axle, spring deflection, ground clearance and wheel camber, i.e. the overall driving characteristics are changed.

There are no such problems with the single joint swing axle. A hydropneumatic compensating spring automatically controls all load conditions ensuring that the wheels remain parallel under any load. (Vehicles with air suspension do not require a compensating spring since the automatic level adjustment is built into the springing system.) The motoring journal "KRAFTHAND" comments: "This effect, which almost borders on magic, is achieved by skillfully applied hydraulics combined with a clever pneumatic trick."

To put it simply, the hydropneumatic compensating spring is a double-acting spring strut which lifts the rear part of the vehicle through the swinging action of the rear axle. This is effected by pumping oil (= hydro) from one cylinder chamber into the others; in this way a difference in pressure is built up, which increases the carrying capacity (fig. 31).

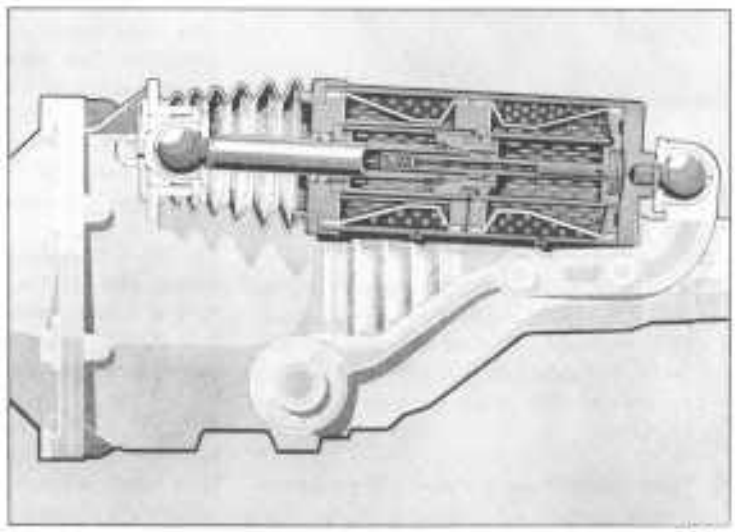
Advantages:

- Optimum roadholding under every load.
- Improved comfort because spring travel remains the same even when the vehicle is heavily loaded.
- The towing of a trailer does not pose any problem since the rear section of the vehicle does not sag and the constant rear wheel camber cuts down on tire wear.
- The system is automatic, maintenance-free and noiseless.

4 hydropneumatic Single-tube dampers

It is a well-known fact that shock absorbers are mounted between wheel suspension and body and are designed to dampen vibrations. (Therefore, they should actually be called vibration dampers.)

Most automobiles are fitted with **twin-tube dampers** (fig. 28). A piston (2) fixed to a rod moves in an operating cylinder (1). The operating cylinder fits into another tube (3) with which it forms one unit. The inner cylinder space is fully, the outer space (4) only partly, filled with oil. When a wheel lifts on driving over road undulations, the piston pushes into the operating chamber. The oil escapes through a valve (A) in the piston into the upper operating chamber (5). The friction of the oil running through the bore causes an aerodynamic resistance, counteracting the telescopic motion of the damper. During this motion, the piston rod pushes further into the upper operating chamber, thus forcing a corresponding quantity of oil from the operating cylinder into the ring chamber. This takes place via the floor valve (B), which has a higher resistance than valve A in the piston.



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Mercedes-Benz is one of the few car manufacturers – apart from Porsche – who have **single-tube dampers with gas pad** (fig. 29) as standard equipment. The following reasons led us to use these expensive "hydropneumatic" dampers.

- Excellent cooling of the dampening oil through the air flow
- Higher oil quantity and bigger piston than with a twin-tube damper
- Excellent effectiveness as a result of the additional gas pad.

The characteristic feature of the Bilstein single-tube damper installed in Mercedes-Benz cars is the gas pad (1). It is subject to a pressure of approx. 427 lbs./sq.inch (30 kg/cm²) and separated from the pressure oil by a snugly fitting piston. Gas pressure forces this separating piston against the oil and prevents it from starting to foam. (Without pressure the damper oil foams in any case).

How safe a chassis is, can be seen from such a small detail as the shock absorber among other things.

Well-proved steel suspension

(280 S/280 SE)

Since 1932, separate construction elements have been employed for the location and suspension of wheels on Mercedes-Benz vehicles. The suspension of the 280 S/280 SE consists of coil springs, hydropneumatic single-tube dampers and large rubber helper springs (acting as spring stops). We have already elaborated on the elements of wheel location under the heading "Double wishbone front axle". This carefully tuned system offers the customer **comfort and safe road-holding.**

Advantages of our steel suspension:

- The suspension is sufficiently soft to absorb bumps from the road and to keep the body free from vibrations as much as possible.
- Both with unloaded and loaded vehicle, the suspension ensures equal comfort, because, due to the hydropneumatic compensating spring, the spring action of the coil springs remains constant.
- The hydropneumatic single-tube dampers dampens the suspension so well that after driving over bumps vibrations are not transferred to the vehicle.
- The large rubber helper springs ensure progressive spring action, i.e. the initial springing is soft, getting progressively harder towards the end of the spring travel.

Exemplary air suspension

(300 SEL, 300 SEL 6.3)

The suspension of the wheels and shock absorbers of the 300 SEL and 300 SEL 6.3 are identical with that of our steel-sprung vehicles. 4 air springs consisting of air chambers (fig. 33, a) with bellows (fig. 33, b) replace the coil springs.

Working principle

Fresh air is sucked in through the air filter by the air compressor (fig. 32, a) which is driven by a V-belt, compressed to 228 lbs./sq.inch (16 kg/cm²) and then pumped to a reservoir (fig. 32, b). Before this the sucked-in air is led through an automatically operating antifreeze device consisting of a container with alcohol enclosed in a casing (fig. 32, c).

A alcohol-air mixture is formed above the alcohol which, as in a carburettor, is carried along by the air flow. This mixture prevents the lines and valves from freezing.

From the reservoir, the air is distributed by a valve unit (fig. 32, d) to the 3 level control valves (fig. 32, e). To ensure uniform road contact of all 4 wheels, even with an asymmetric load distribution, the level control valves are arranged as on a three-legged stool, namely 2 for the front wheels and 1 for the rear wheels. These 3 valves keep the vehicle level constant at all times, adjusting the air flow to the spring bellows according to the load.

If the vehicle height is changed along the longitudinal axis (side tilt) the front left or right control valve responds; if the level is changed along the transverse axis (e.g. when loading the trunk) the correction is made by the two front and the rear control valves.

The ride level adjustment is simple in principle, but outstanding in effect. The control valve on the front axle is operated by the lower wishbone which is connected to it via a connecting rod (fig. 33). The control valve of the rear axle is actuated by a lever attached to the anti-roll bar.

Fig. 34, a illustrates the normal load condition. The control valve is shown in section. 1 = inlet valve, 2 = non-return valve, 3 = control bolt, 4 = pinion, 5 = outlet valve, 6 = operating lever.

E = air inlet (from reservoir), B = line to/from spring bellows, A = air outlet, H = level adjustment. Inlet and outlet valves are closed.

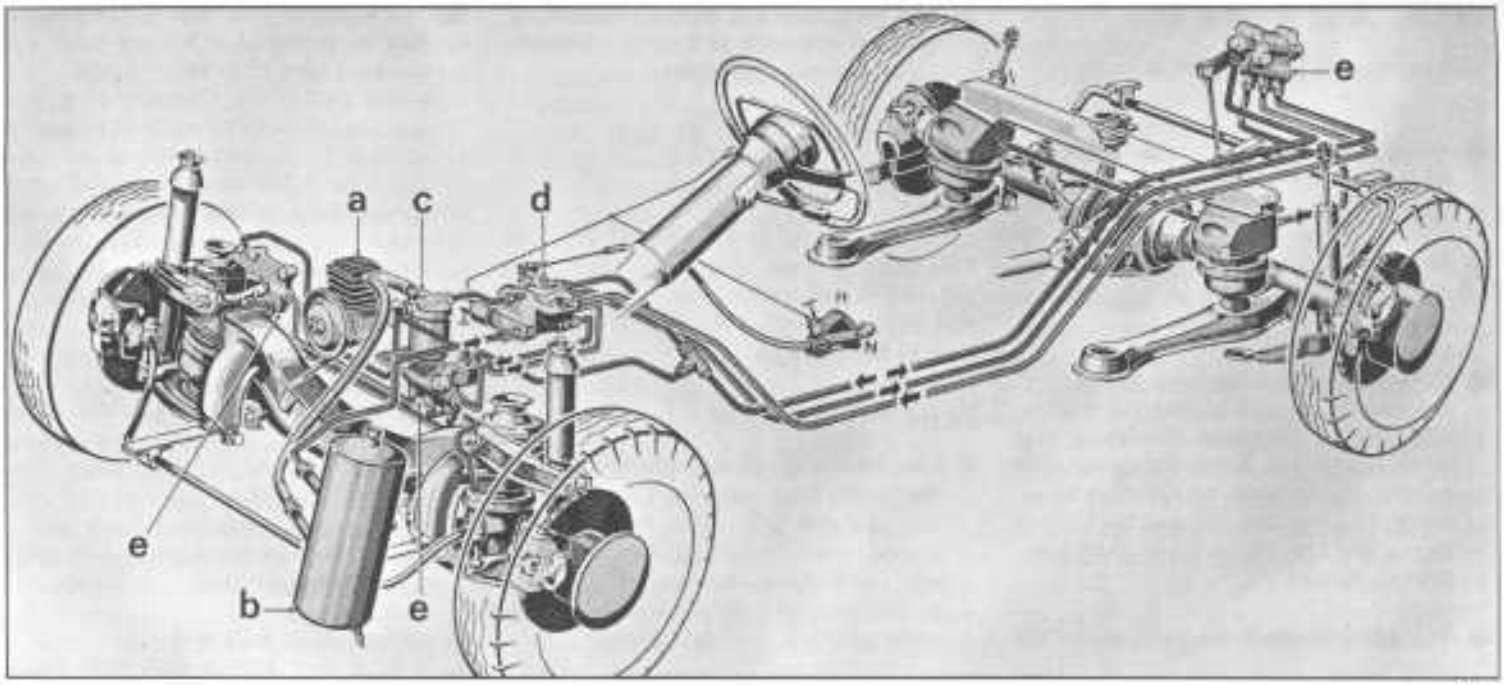
Fig. b shows what happens when the vehicle is loaded. The upward motion of the lower wishbone is transferred, via the connecting rod, to the operating lever (f) which is firmly attached to the pinion. The pinion opens the inlet valve via the control bolt to allow the compressed air to flow into the air chamber and the spring bellows. The volume of the air bellows increases, lifting the vehicle to its normal height and shifting the operating lever to the position as shown in fig. a. The inlet valve is closed. The non-return valve serves to prevent the escape of air from the spring bellows if a leak develops in the system in front of the control valve.
Fig. c illustrates how the car body rises when it is unloaded. The compressed air flows out of the spring bellows through the opened outlet valve until the normal height is again reached.

The driver adjusts the level by switching to position N = normal level or H = increased level. In position "H", compressed air flows to the control valves via additional lines, opening the inlet valves – this time the operating lever is not actuated (fig. d). The height of the car is increased by 50 mm (1.97"). During driving, the ride level is controlled by the operating lever as in position "N".

Advantages of the MB air suspension

- Maximum driving comfort through constant spring action
- The air spring bellows form an excellent insulation against noise
- Uniform driving properties under all load conditions
- Ground clearance increased by 50 mm (1.97") through the level adjustment

MB air suspension is absolutely reliable and perfected in every detail, for, as you know, Daimler-Benz have had many years of experience with air suspension in bus production.



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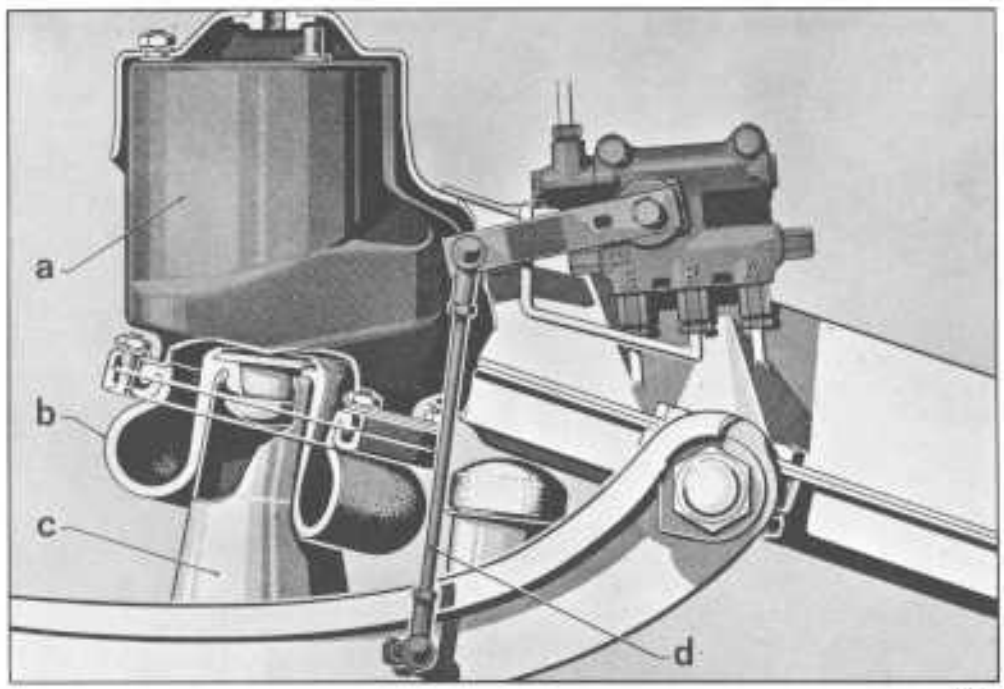

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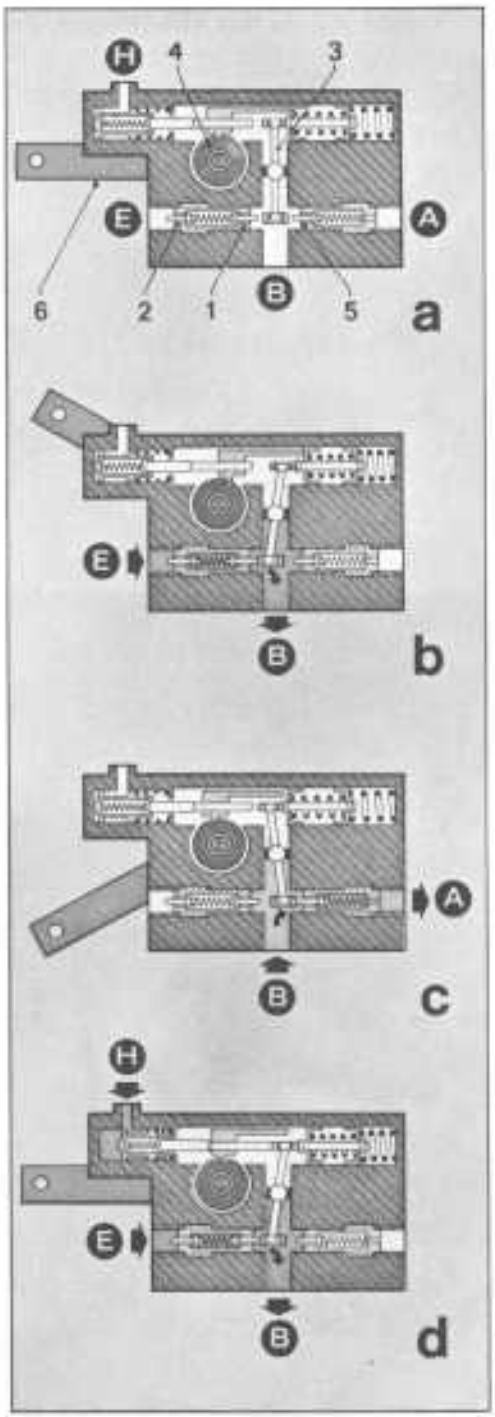

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Wide-oval tires for maximum performance

- Wide-oval tires have an **extremely wide contact surface** and therefore constant complete road contact.
- **Two hump shoulders** (red arrows, fig. 36) guarantee a close fit between rim and tire.
- **In the event of a blowout during driving the tire is not pulled off the rim but held by the hump shoulders.** Fig. 36 shows clearly a tire being cut with a knife (a). In spite of the loss of air inside the tire, the car can be braked slowly and brought to a standstill without skidding.
- The **bead** protects the side wall from damage.
- The wide cross-section makes it possible to **install large brakes.**
- The wide-oval tire **absorbs road irregularities** and acts as a good insulation against strong vibrations.

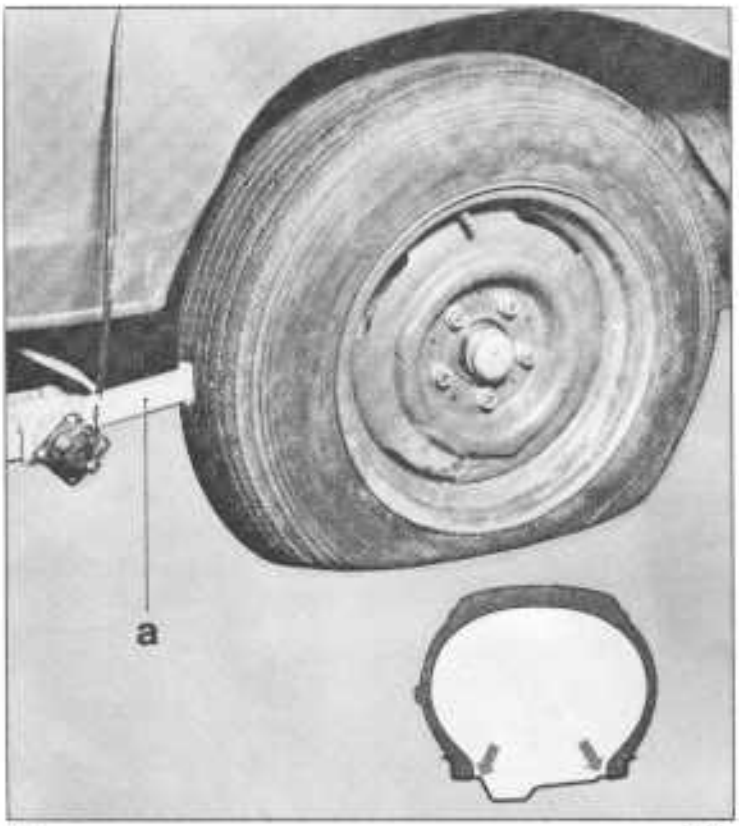
Wide-oval tires in the 300 SEL 6.3

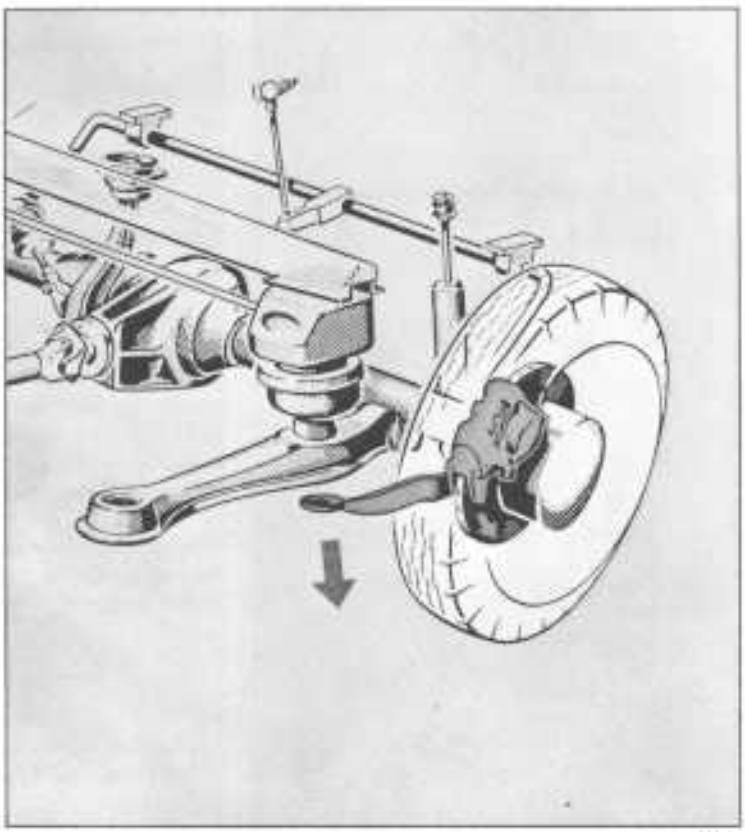
7.7" (195 mm) wide high-speed tire, 195 VR 14 (V = very fast, i. e. more than 130 mph = 210 km/h).
This fast and heavy vehicle has radial-ply tires as standard equipment.

Braking System

- **Disc brakes on all four wheels**
  For some time now we no longer fit our vehicles with drum brakes. Disc brakes are insensitive to heat even with continuous braking, they keep to the track and, in addition, make for more efficient cooling (fig. 38).

  For better heat dissipation, the brake discs of type 300 SEL 6.3 are ventilated from inside (radially) (fig. 37).
- **Two brake circuits with warning light**
  The front and rear wheels have separate brake circuits. Should one brake circuit fail because of a leak, the car is braked with the second system. At the same time a red warning lamp lights up on the dashboard. (Brake fluid is lost through the leak and through the sinking float an electrical contact is released in the affected fluid container).
- **Brake boost**
  Little effort is needed to actuate the servo brake (3/4 of the force necessary is taken over by the booster brake). This is why the brake force can be precisely apportioned. This fact ist of special advantage and an important contribution towards safety particularly on wet and icy roads.
- **Brake pressure control**
  It is a well known fact that during braking, the mass of the car pushes forward. The front axle is additionally loaded and the rear axle relieved. The





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ratio during all-wheel braking is approximately 75 % in front and 25 % at the rear. Based on these values, the front wheel brakes have to be more powerful than the rear wheel brakes.

For slight braking (e. g. on smooth road surfaces) the weight distribution is considerably lower and the portion of brake power to be made available by the rear axle correspondingly higher. In this case the rear wheel brake cylinders have to be larger, in fact so large that, in the event of all-wheel braking, the rear axle would be completely overbraked.

To provide a system, which can cope with both cases, the big rear wheel brake cylinders are still used, but a pressure-dependent brake power control valve (fig. 38, a) reduces during heavy braking the oil pressure to such an extent that the rear wheels receive a lower oil pressure than the front wheels, their braking force being correspondingly weaker.

Advantages

- The rear wheels do not block even at panic stops.
- With the help of the large rear wheel brake cylinders, braking distances are reduced.

● **Brake torque compensation on rear axle**

Brake torque compensation is achieved by means of a lever system, which connects the rear wheel brake, of types 300 SEL and 300 SEL 6.3 with the frame floor unit (fig. 37). It prevents the car's rear from rising when braking.

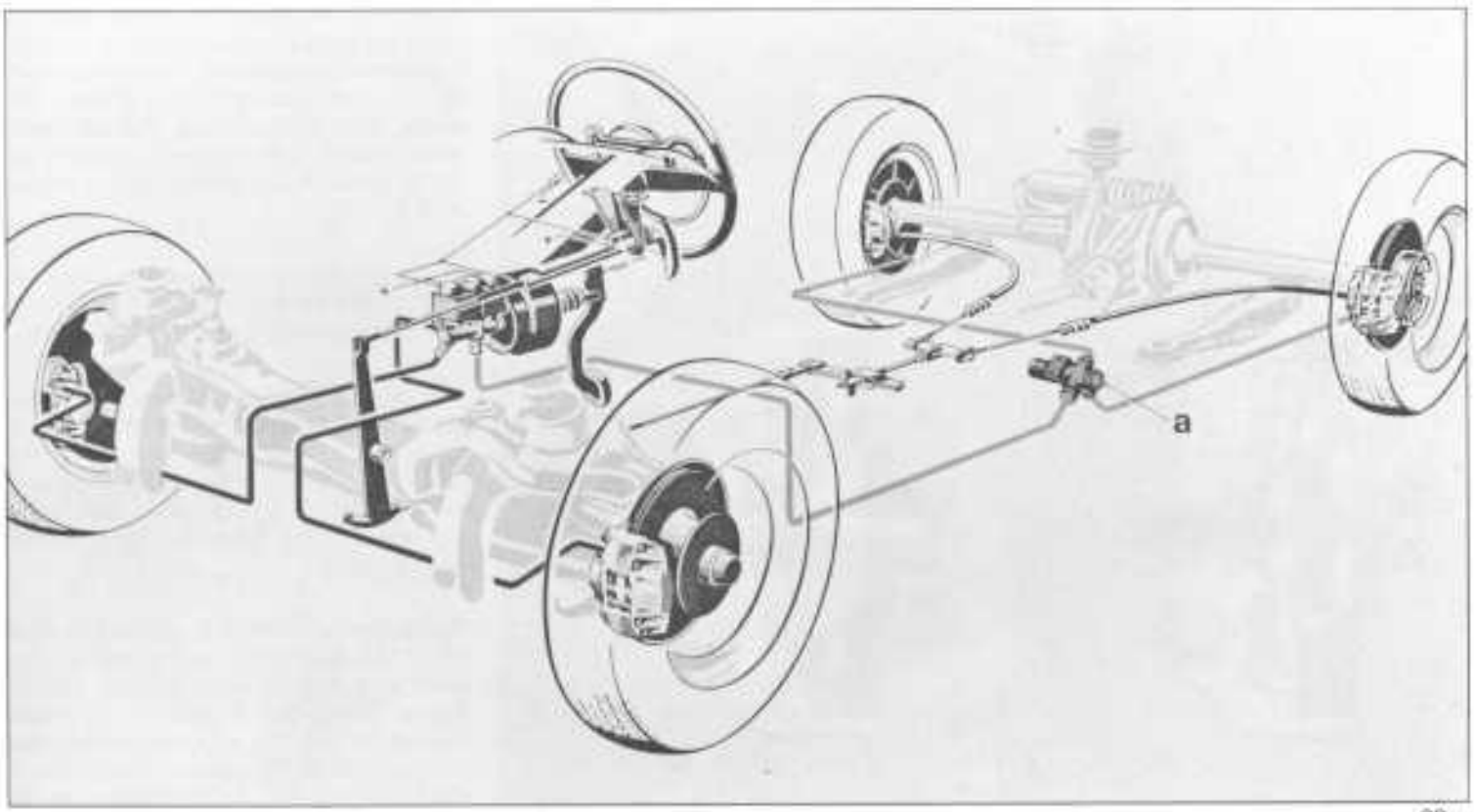
During the braking procedure, the rotating brake disc pulls the caliper downwards. Via a lever, this downward movement of the caliper exerts a vertical pull at the connecting member of the brake torque compensation device, which is mounted with its upper end to the car floor, thereby preventing the car body from rising at the back.

Low-effort diaphragm clutch

At present, Mercedes-Benz passenger cars, are still the only high-quantity produced vehicles which have diaphragm clutches with automatic wear adjustment.

The clutch is particularly easy to operate. A dead centre spring (fig. 39, red) supports the driver's foot pressure on the pedal, thus acting as a servo unit so-to-speak.

Figure 39 shows the layout and function of the diaphragm clutch. 1 = diaphragm spring, a = declutched. In order to keep the clutch actuation free of engine vibrations, the pedal movement is hydraulically transmitted (blue line).



MB Automatic

As you can see from the survey on page 11 models 300 SEL and 300 SEL 6.3 have an automatic transmission as standard, whereas models 280 S/280 SE can be equipped with this type of transmission on special request.

Before explaining the function of the MB Automatic, we should like to repeat the most important advantages of the MB Automatic:

- Safe overtaking through rapid acceleration.
- Unusual driving conditions (such as e. g. encountered by flat country drivers in the mountains) present no difficulties.
- Higher road safety owing to increased concentration on the traffic.
- Reduced physical strain.
- Easy driving in bumper-to-bumper traffic.
- Driving with a trailer presents no problems, since there is no interruption in the power flow when changing gears.
- Increased service life and operational safety as compared to the mechanical gearbox with friction clutch.
- On icy or slippery roads in particular the smoothly operating hydraulic clutch is superior to the usual friction clutch.

Objection: "Not sporty enough"

Basically speaking, correct gearchanging needs a lot of empathy, this can, however, be studied and developed to the point of "virtuosity". Many drivers are so proud of this ability that it presents one of the most important objections to the automatic transmission. Similar to hard springing, the physical "work" when operating the clutch or changing gears is felt to be sporty and the low-effort Automatic not sporty enough.

In reality, we leave the simple operations to the Automatic in order to be able to concentrate more on the difficult situations, with which we are confronted. The points listed below are intended to help you to refute the objection regarding the non-sporty automatic transmission.

- The driver is able to override the automatic gearchanging programme at any time and select the gears manually as with the mechanical gearbox.
- Overtaking is even faster, since with the kick-down the lower gear is immediately available. In the case of mechanical transmission, there is an interruption in the power flow when the clutch is operated and gears are changed, which, naturally involves a loss of time.
- The maximum speed is reduced by 2–3 %, a value, which, as is well known, lies within the range of normal series-produced cars and, therefore, has only theoretical significance.
- The four speeds of the MB Automatic ensure that the performance of these cars is not inferior to those equipped with mechanical transmission. All other fully automatic transmissions have usually only three or two speeds with a less favourable effect.
- Porsche and Ford proved that even races can be won without the clutch pedal (e.g. in 1965, 12 hour world championship race at Sebring, USA and in 1966, the 1,000 km race on the Nürburgring).

Objection: "Higher fuel consumption"

Driving with the MB Automatic need **not necessarily mean increased fuel consumption.** Those who, up to now, have preferred to drive in second and third gear in order to have a good reserve available for acceleration without having to change down, will be able to achieve more favourable results as regards fuel economy with the automatic transmission. On the other hand, many drivers will have a higher fuel consumption because they will now use the easily available kick-down more often, while before they did not drive in direct gear.

As you can see, fuel consumption depends to a far greater extent on the individual driving technique than on the type of transmission. In all fairness, those who drive faster should not maintain that their higher fuel consumption is caused by the Automatic.

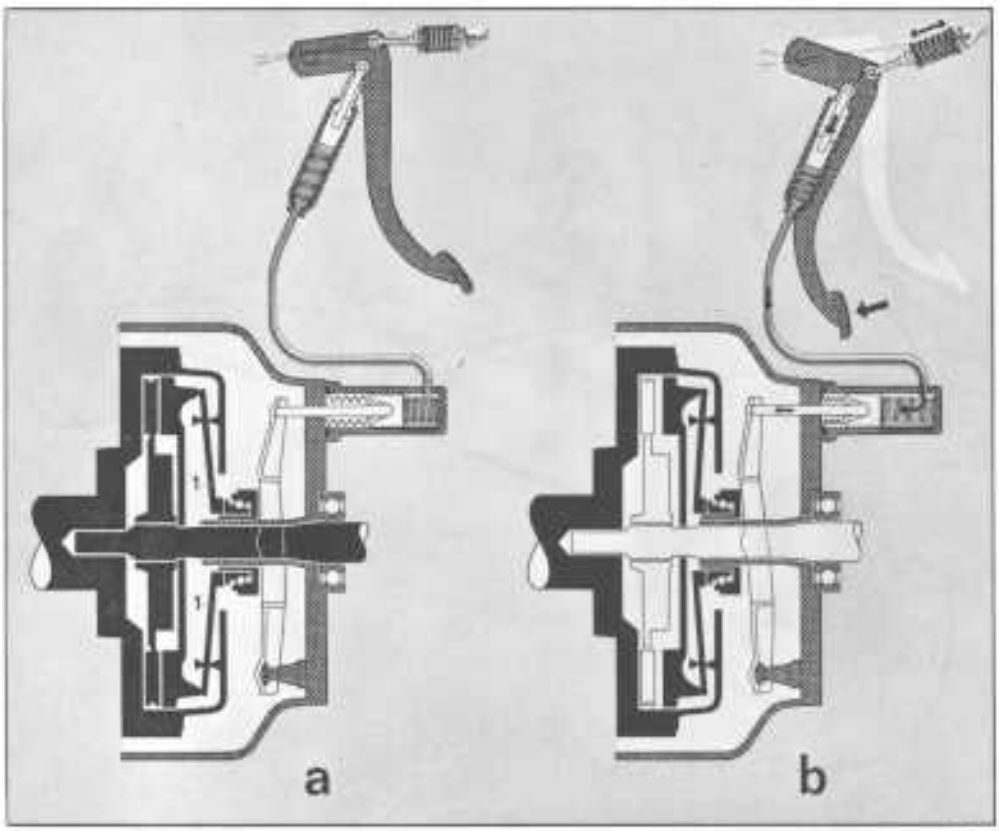
Layout and method of operation

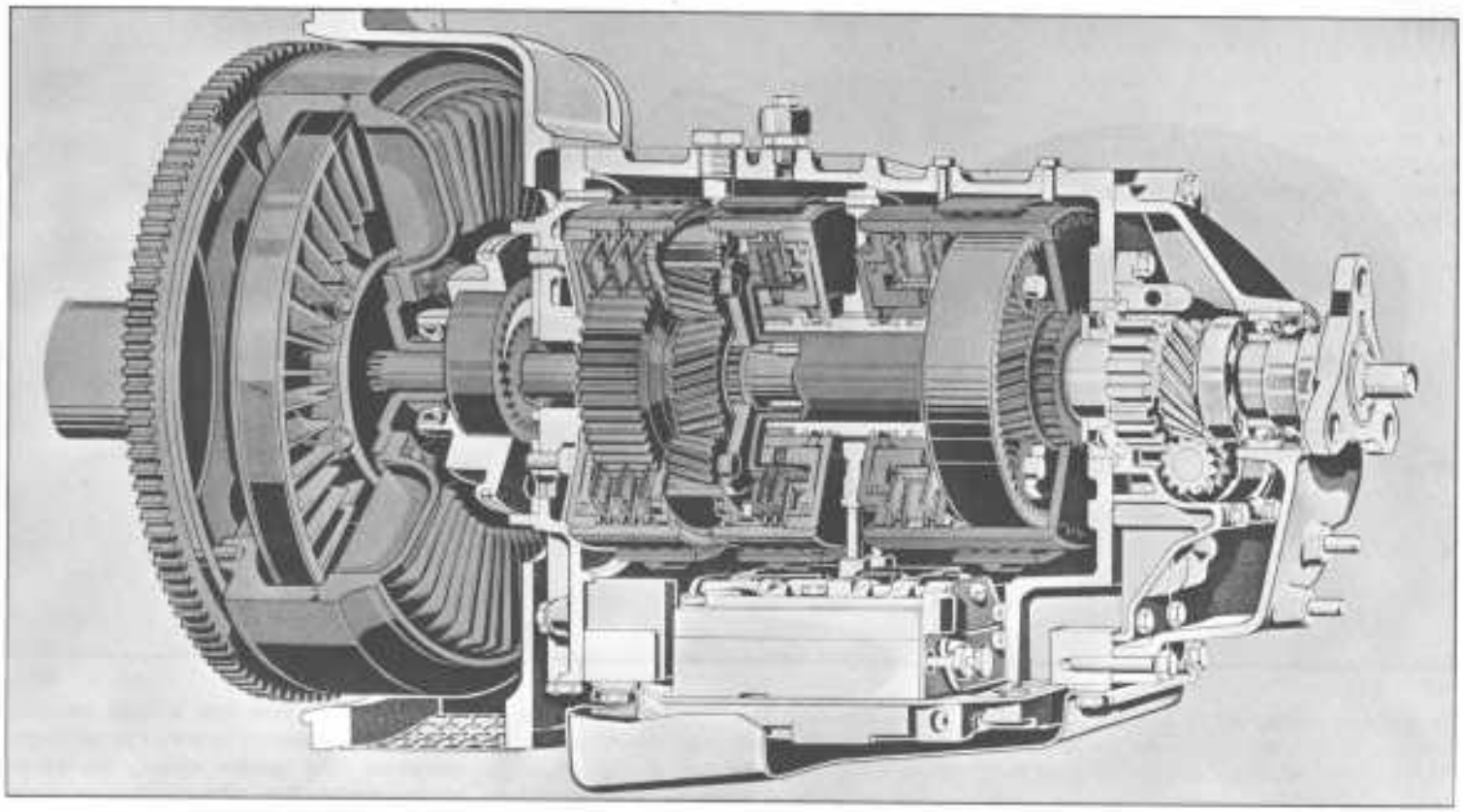
Principally, all types are fitted with the same automatic transmission. It consists of a hydraulic clutch and a series-connected planetary gear set (41). Without deviating from this principle, the automatic transmissions differ in their layout in order to make maximum use of the engine output.

All types have three planetary gear sets. (Fig. 40 shows the previous transmission with two planetary gear sets.)

The hydraulic clutch consists of two rotors lying opposite each other, one of which (the primary rotor) is driven by the crankshaft, whereas the other (the secondary rotor) is rigidly connected to the sun wheel of the first planetary gear set (fig. 40 and 41).

The clutch is filled with oil and sealed. When the engine is running, the primary rotor sets the oil in a rotating motion. During idling the oil does not rotate enough to set the secondary rotor into motion as well. The vehicle is at a standstill. Opening the throttle wider, i.e. in-





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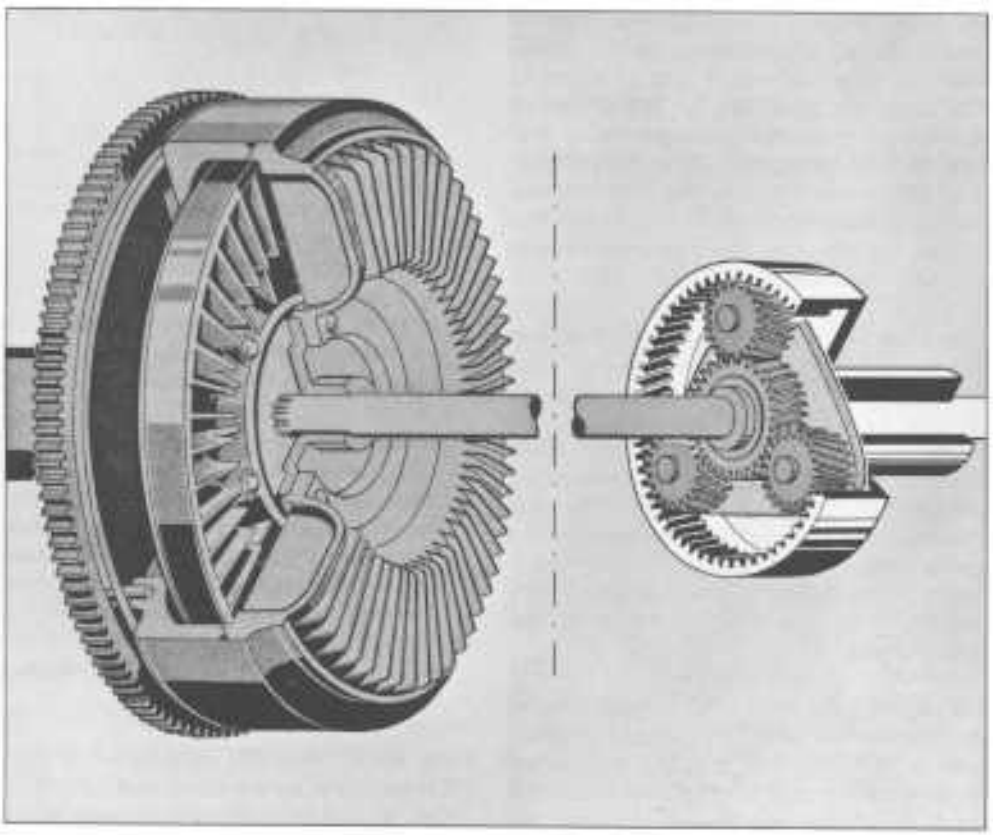
creasing the engine speed (= primary rotor speed) the rotating oil sets the secondary rotor, and thus also the planetary gear train, in motion. As soon as a gear is selected the vehicle starts driving.

As you know, the planetary gear consists of two or three **planetary gear sets.** The internal layout of a planetary gear set is shown in fig. 42. The **hollow gear wheel (1),** which is situated on the outside, has internal gearing in which a ring of planetary gears (2) moves. The planetary gear wheels are mounted on the planetary gear wheel carrier (4), which can also be set in rotating motion.

In the middle there is the **sun wheel (3),** which is rigidly connected to the secondary rotor.

The desired reductions (= speeds) are reached with the two planetary gear sets by keeping the individual components in place. This is achieved by means of brake bands and multiple disc clutches.

Example:
In first gear, the hollow wheel of the front planetary gear train is kept in place by the brake band. Moved by the engine-driven sun wheel, the planetary gears move along the internal gearing of the hollow wheel. For the planetary gear carrier the reduction in relation to the number of teeth is 1 : 2.52 (42, A). While the engine speed changes, the torque increases correspondingly. The planetary gear carrier I is rigidly connected to the hollow wheel of the second planetary gear set.



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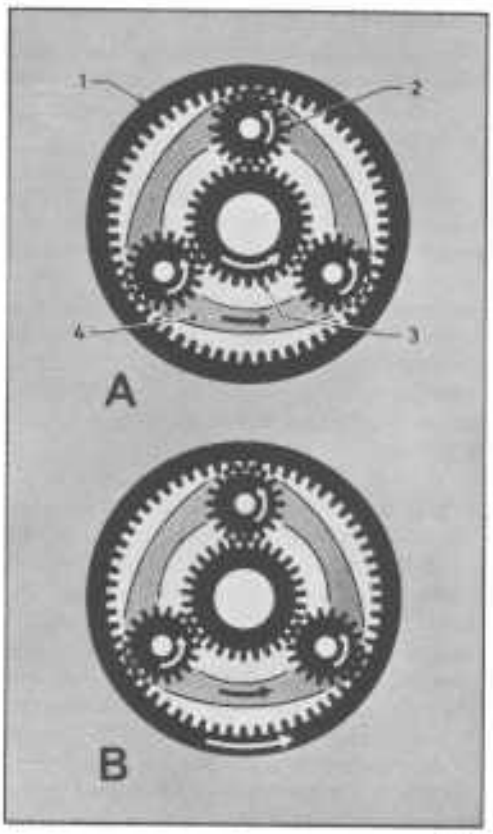

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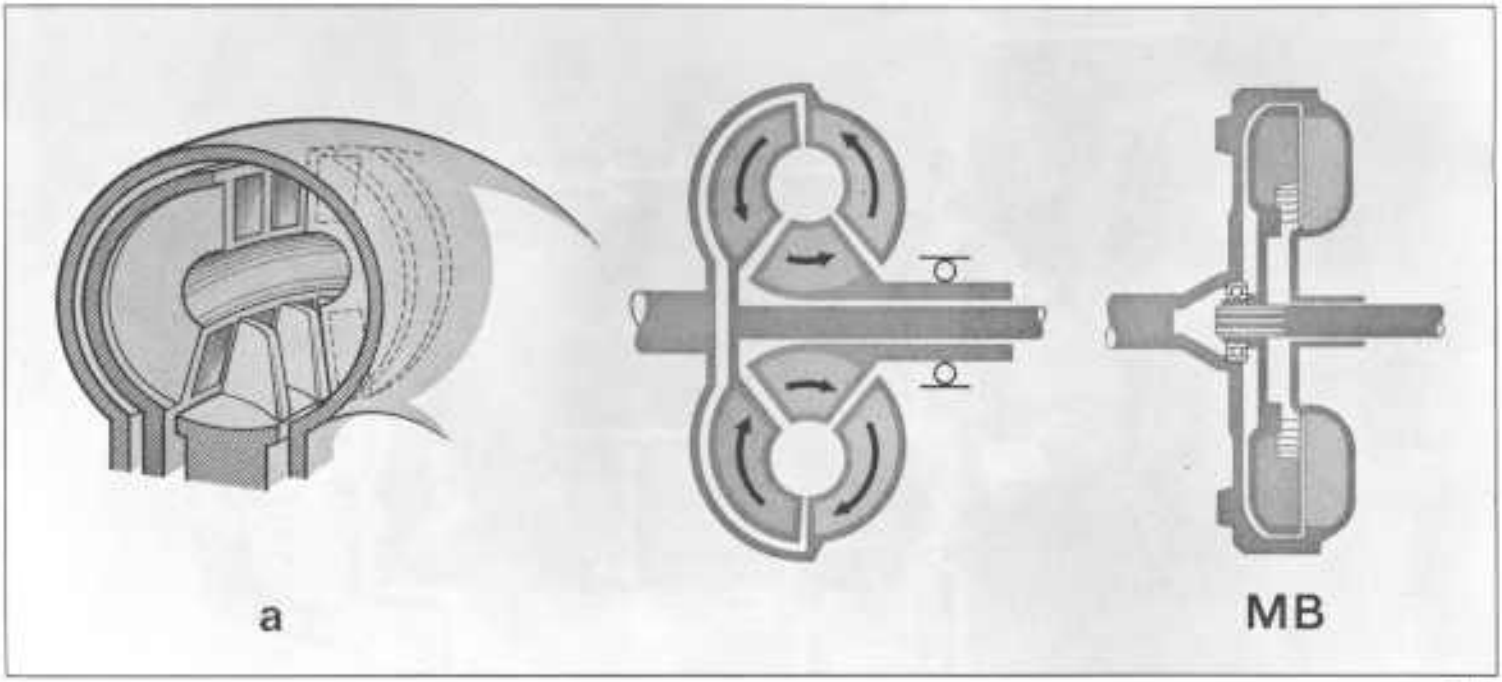

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In planetary gear set II the sun wheel is braked in first gear. The hollow wheel II turns at the reduced speed of planetary gear set I, the planetary gears move along the locked sun wheel and move the planetary gear carrier II with a reduction of 1 : 1.58 (42, B). When these two reductions are multiplied the result is a total reduction for the first gear of 1 : 3.98, which is available at planetary gear carrier II. The planetary gear carrier II is rigidly connected to the cardan shaft (having the same speed) via the drive shaft.

In principle, the remaining gears are similarly changed. We can, therefore, omit any further explanations.

How is the gearchanging process controlled?

The gears are controlled by the speed (through step pressure transmitter) and the accelerator pedal position (through modulating pressure transmitter).

The step pressure transmitter is located on the drive shaft. Depending on the speed of the rear wheels (vehicle speed) centrifugal weights are moved inside, which increase or reduce the oil pressure acting on the **sleeve shift box.** The oil pressure causes the control piston to release the coupling and to apply or release the brake bands on the planetary gear sets.

If only step pressure were available, the transmission would always shift at the same driving speed. This is why the MB Automatic contains another control device, the modulating pressure transmitter which influences the shifting point depending on the accelerator pedal position (throttle valve position) and the vacuum in the suction tube. Therefore, it can be driven much longer in the individual gear ranges if a high degree of acceleration is required.

When actuating the **kick-down,** a solenoid releases a corresponding impulse on the modulating pressure transmitter, causing immediate down-shifting. The individual gear ranges can be better utilized in this way.

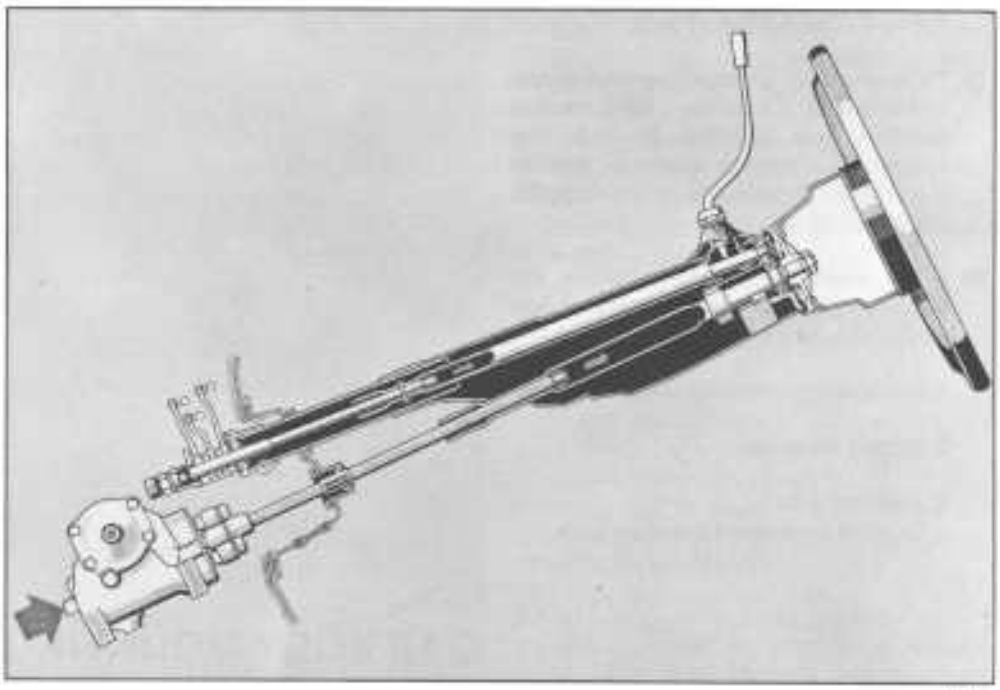
Most automatic transmissions operate with a **torque converter** and a series-connected planetary gear set, which offers two or three speeds.

Method of operation

The crankshaft of the engine is rigidly connected to the converter housing and the pump wheel. The oil, put into rotation by the vanes of the pump wheel, drives the turbine wheel which is connected to the planetary gear. So far the layout of the torque converter corresponds to that of a fluid coupling (e.g. Mercedes-Benz). The **difference** between the two systems is the **guide wheel** which is situated between the vanes of the pump wheel and the turbine wheel (fig. 43, a).

The vanes of the stationary guide wheel are curved in the opposite direction from those of the two other wheels. The oil flowing out of the turbine wheel is abruptly redirected by these vanes, thus causing a reactive effect on the turbine wheel. Owing to the redirection and deceleration of the oil stream at the guide wheel, the torque at the turbine is twice or even three times as big ("conversion") as the engine torque at the pump wheel.

On starting to drive, the turbine begins to accelerate, and the torque conversion is reduced until a point is reached at which pump and turbine torque are the same, i. e. from this moment onwards the whole system acts like a fluid coupling. Since its decelerating effect is no longer required, the guide wheel, no longer under power, free-wheels. The converter has become a coupling.



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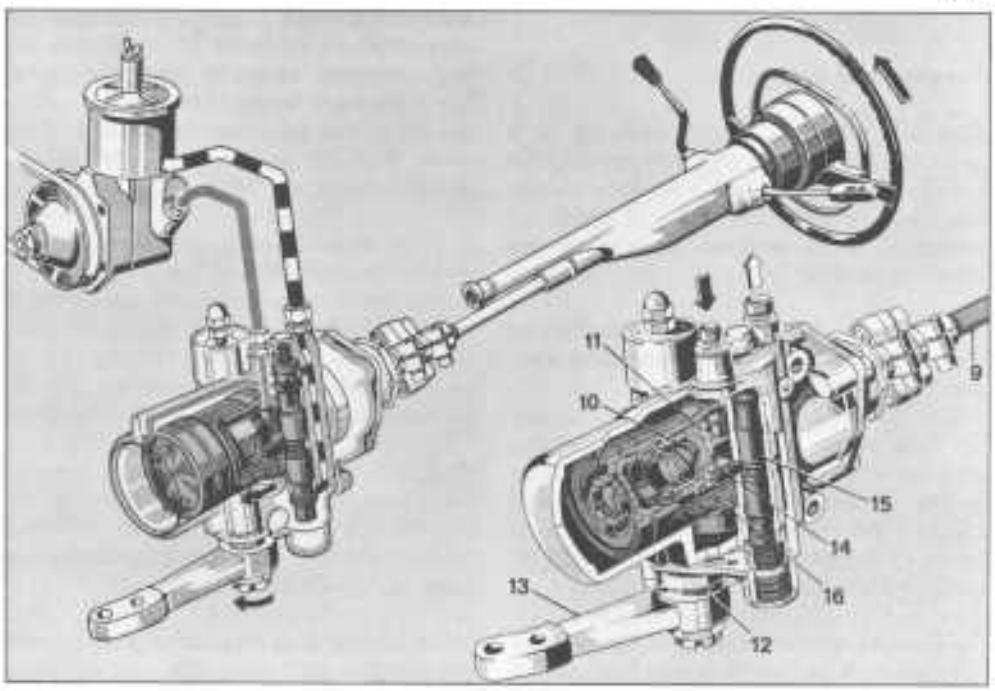

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"The best power steering in the world"

The American motor magazine CAR and DRIVER wrote: "Mercedes-Benz power steering is unquestionably the best in the world". As it is impossible for you to base your sales talk on nothing but slogans, we should like to give you the details which corroborate CAR and DRIVER's judgement.

- With MB power steering the driver has the **actual "road feel",** although to a reduced extent. Good contact between road and driver is retained.

Above all, MB power steering makes for fast driving on winding and wet roads.

The steering wheels of American sedans can be turned effortlessly with one finger, even while the car is stationary (with the engine running, of course). Here one can no longer speak of a genuine road contact. Correspondingly winding roads have to be driven over more slowly and more carefully.

- A **steering shock absorber** prevents vibrations from being transmitted to the steering wheel and the driver.
- Easy handling **frees the driver from fatigue and keeps his reflexes tuned.**
- The vehicle will still be under **safe control** in the event of a blowout of a front tire or if one wheel grazes the centre strip of the autobahn. The force needed for steering never exceeds the specified 6.6 lbs. (3 kg).
- Through ease of handling and direct transmission, 1.5 turns – from neutral position, are needed to lock the wheels, the **turning circle is smaller** than that of vehicles without servo steering.
- In the event of rear-end collisions, the steering **cannot cause injuries.** It has three-fold safety features (fig. 45):

  1. telescoping steering column
  2. impact absorber
  3. steering gear
     located far behind the front axle.

Function and design

Basically, the MB power steering is a recirculating ball steering. However, the steering nut is built into a working piston, the head of which can be put under oil pressure, which ensures support of the steering work.

An oil pump, driven by the crankshaft of the engine via a V-belt, ensures a constant oil flow to the steering.

Up to a power of 1.3 lbs. (600 g) at the steering wheel the transfer of the motion to the wheels takes place fully mechanically via the steering column (9), steering worm (10), nut (11), steering shaft (12) and the pitman arm (13).

As soon as the resistance of the wheels increases, more power is required on the steering wheel. At the guide edge (14) of the nut a larger rotating force now comes into play, which overcomes the pre-tension of a spring and moves the sleeve valve (15), i.e. when the steering wheel is turned to the left it moves downwards and when the steering wheel is turned to the right, the sleeve valve moves upwards. Thus the sleeve valve opens the way for the pressure oil, which reaches the head of the working piston and moves it in a horizontal direction. This movement is transmitted directly via the ball and socket (16) to the steering shaft and the pitman arm (fig. 46).

Should the oil pressure fail (for instance because of a broken V-belt), the steering can still be operated safely without servo assistance.

Loss in performance as a result of the power steering is very low; it accounts for not more than 2–3 HP.

CAR BODY MOUNTING

Frame-floor unit and car body are firmly welded together. They form a single unit, characteristic features of which are the high carrying capacity and stability of the passenger compartment. The safety car body was patented for Daimler-Benz more than 17 years ago (DBP 854157 dated January 23, 1951).

During recent years, almost all automobile manufacturers have started to concentrate more and more on safety in their vehicles. Probably the most spectacular design was the "Safety car of New York State" (developed by officials of the administration, fig. 47b) and the "Sigma" by Pininfarina (fig. 47c). Although these vehicles combined many of the ideas so far produced by the designers, the American magazine ROAD & TRACK made the following critical comment in July 1968.

"The NYSS is a hog of a car, grossly overweight and oversize, yet offering seats for four only. First of all, the Sigma is more sensible and, incidentally, very good looking. The NY car is 220 in. long, the Sigma only 180 in. The Sigma is only about 70 in. wide; the NY monstrosity is 80 in wide. No NYSS has been built despite its design. If it were to be produced in, say, Thunderbird quantities it would have to have a sticker price of at least $ 10,000. If, however, the annual production rate was around one million the price could be substantially reduced – I'd say maybe a little under $ 7,000. I'll bet the NYSS, if ever built, will exceed 5,000 lb unloaded.

And to top it off, the NY car doesn't even have independent rear wheel suspension. It's been offered to the industry – with no takers, which is pretty understandable.

Finally, to end this tirade, let's look at Mercedes sedans. While we have absolutely no access to comparative crash test data, I'm sure that no car from Europe and very few from America can equal the all-around safety of Mercedes cars. Note, I said "all-around" and this includes handling, maneuverability and brakes as well as progressive sheet metal collapse. And they're neither heavy, bulky, nor ugly."

For details on the various measures in connection with active and passive safety in MB cars, please read the prospectus "MB safety – a Reality".

40 lbs (18 kg) of paint

The paintwork consists of several layers, the functions of which are complementary. The particularly critical sections left and right of the radiator grille have sevenfold protection (Fig. 49. The diagrams clearly show the position of the individual layers but do not give any indication as to their thickness).

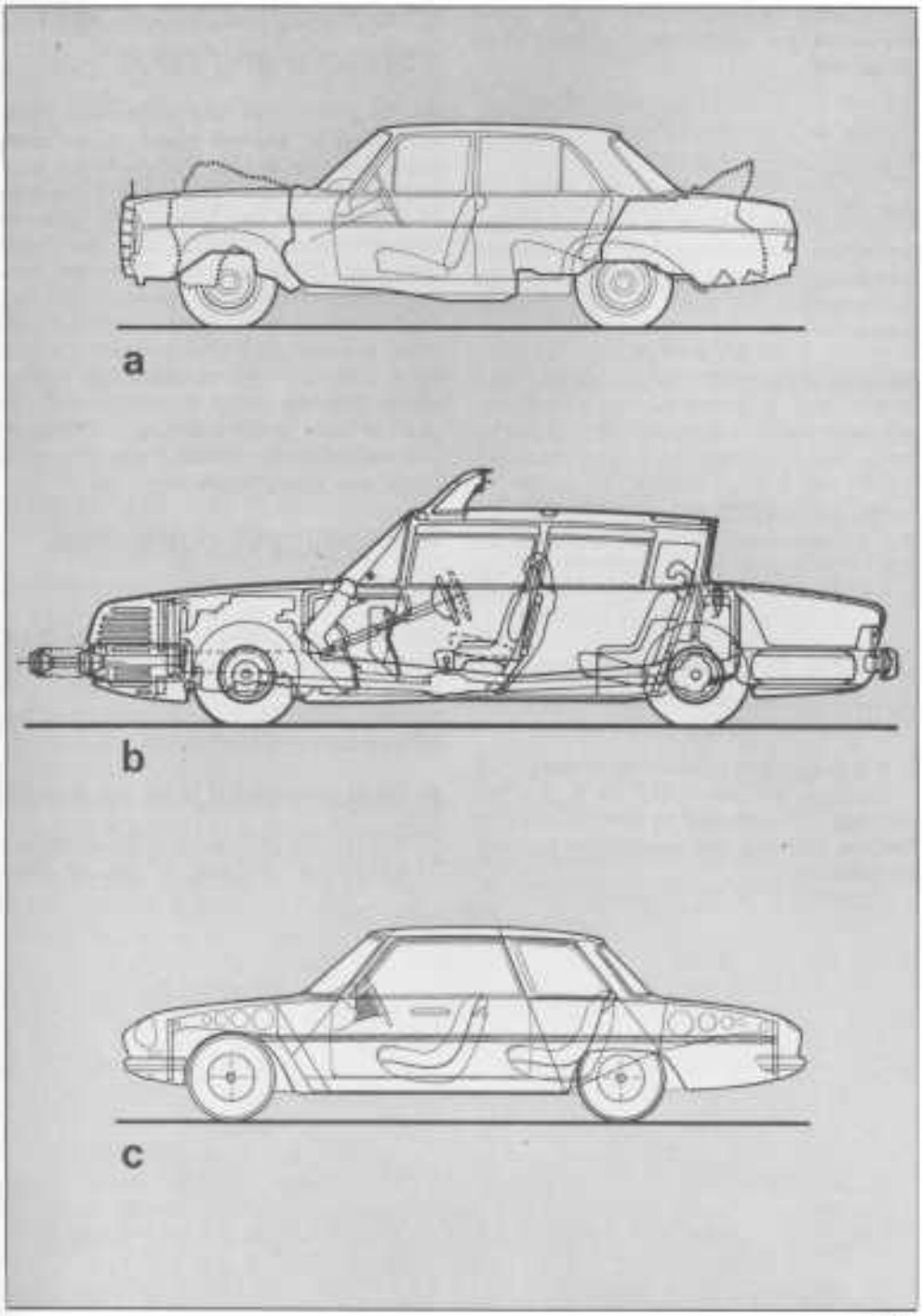
1 = **Bonderizing**
The first corrosion protection consists of finely crystalline zinc phosphates. This protective layer, in conjunction with the paint, prevents the formation of rust, if at a certain spot the paintwork has been damaged right through to the metal.

2 = **Passivation**
In order to ensure that the whole metal surface is covered, the car body is passivated by means of chromic acid, which represents a further protection against corrosion.

3 = **First primer**

4 = **Second primer**

5 = **Gravel protection**
The front part of the body is additionally sprayed with a layer protect-



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ing against gravel. Owing to the special composition of this layer, flying stones can cause little or no damage to the paintwork.

6 = **Undercoating**

The undercoating serves in the first place as a basis for the finishing coat. It improves the properties of the finishing coat and in particular the quality of the finish.

7 = **Finishing coat**

The finishing coat does not only give the car its good appearance, but is, at the same time, an outstanding protection against all sorts of harmful substances in the air. The finishing coat is smooth and hard and offers effective resistance to varying climatic influences. Furthermore, it ensures easy cleaning.

Except for the 5th layer, which is applied to the front parts only to protect the car against gravel, this multi-layer system protects the entire vehicle surface.

All layers of paintwork are baked individually at temperatures ranging between 266–329° F (130–165° C), thereby being converted into insoluble hardened resin lacquers.

31 lbs (14 kg) of PVC and wax

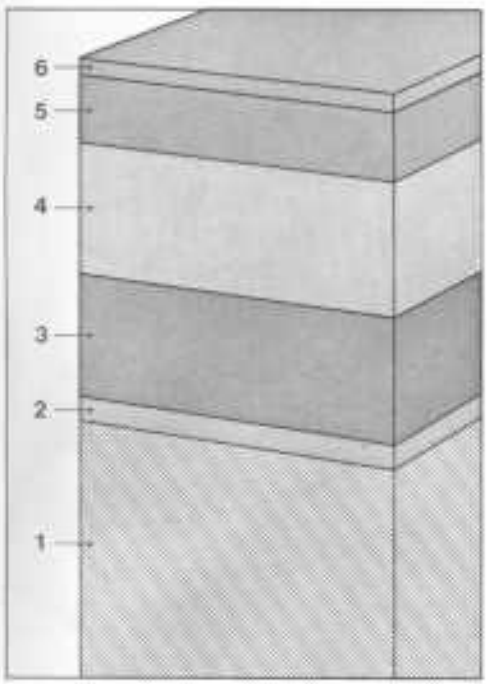
During driving, fenders, entrance, front part and the underfloor of the car are particularly affected by flying stones. They are, therefore, provided with a thick protective layer made of high-class PVC, which also forms the basis for the hard-wearing MB leatherette.

After baking, the resulting layer offers maximum protection because it remains elastic and thus prevents sharp stones from causing damage by going right through to the metal. Furthermore, the PVC layer offers effective acoustic insulation.

Engine compartment, underside of the car including axles, drive shaft as well as fuel and brake lines are additionally sprayed with wear-resistant wax.

Hard-wearing chromium plating

Chrome combines decoration and corrosion protection in one. The cross-section of the radiator grille (fig. 48) shows five layers of copper, nickel and chromium on top of each other. 1 = steel, 2 = mat copper, 3 = glazed copper, 4 = semi-glazed nickel, 5 = glazed nickel, 6 = double chromium. Thus the formation of the much-feared blisters and rust pores and also the attack on the basic metal is reduced or at least considerably retarded.



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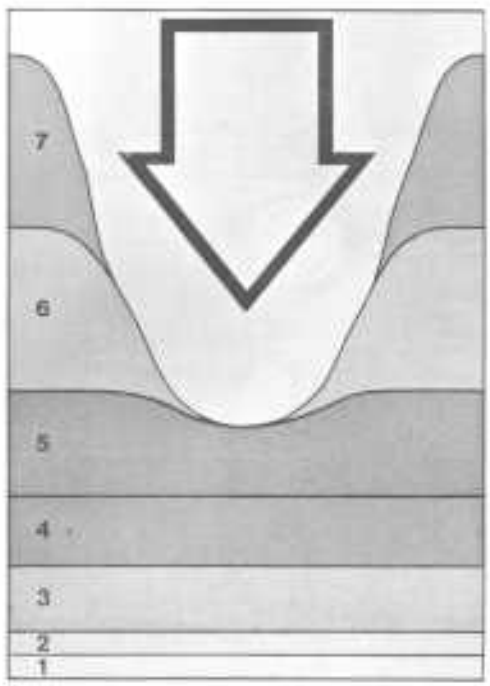

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Optimum Passenger Compartment

functional
comfortable
safe

There is hardly an automobile manufacturer who does not maintain that his vehicles are comfortable. Only when leaving cars of a certain make after long hours of driving, feeling exhausted and – according to the circumstances – even with aching bones, it becomes obvious, that genuine comfort cannot be achieved simply by installing soft seats.

Our designers know how expensive it is to create genuine comfort because it requires precision work and a high standard of quality in every detail. Nevertheless they have designed a passenger compartment, which is comfortable, functional and safe, for **driving a car can be more strenuous than piloting a jet plane.** This is why in this section Daimler-Benz has invested rather too much than too little. Even sporty cars need not have hard springs, be uncomfortable or cause the passenger and driver to feel cramped (see 280 SL).

Here are a few interesting details about the passenger compartment of Mercedes-Benz cars:

Large interior

In spite of the favourable outward dimensions, the Mercedes offers a roomy and generously planned interior. The real proportions can be seen in the following table:

	A	B	C	D	E
Mercedes-Benz	37.8	34.1	32.7	61.0	61.0

In the models 300 SEL and 300 SEL 6.3 the measurement "C" is increased by 1.6".

21.5 cu. ft. (610 l) luggage compartment

If it is a question of accommodating a lot of luggage, we have a 21.5 cu. ft. (610 lit.) luggage compartment to offer in spite of the low belt line and reasonable outward dimensions.

Effectively insulated against vibrations and noise

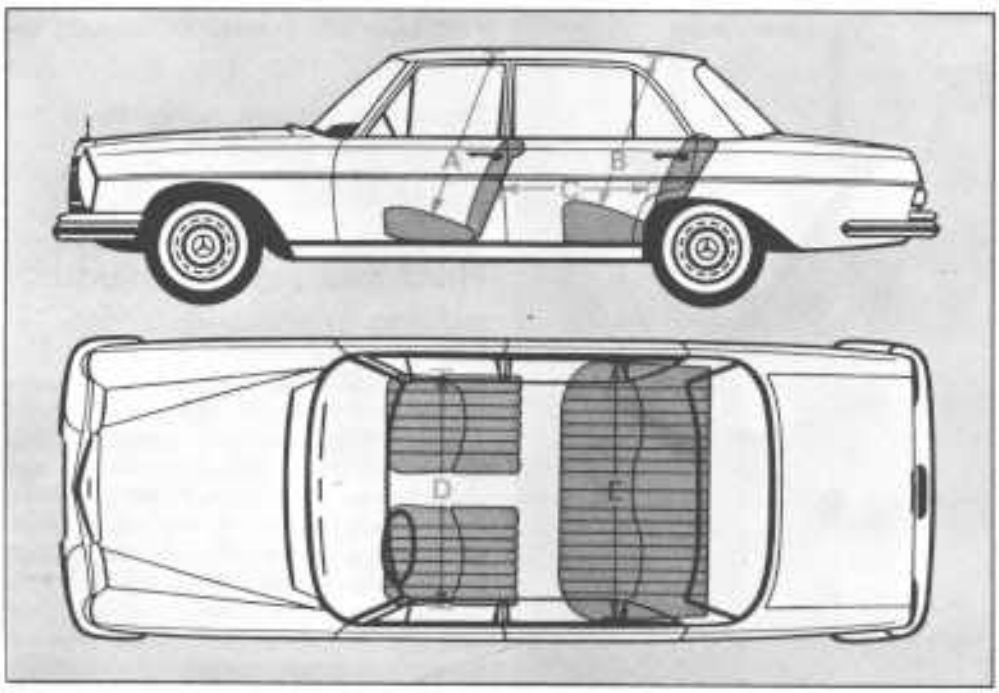
An insulating mat, 0.7" (18 mm) thick, consisting of several layers hermetically separates the engine compartment from the passenger compartment. On the metal base of the car floor lies a layer of insulating material which is in part more than 0.8" (20 mm) thick. Even the rear wall of the hat shelf is covered with felt. The cover of the luggage compartment floor, the hat shelf and the roof are part of a complete sound-absorbing system comprising the entire passenger cell. As you can see, genuine driving comfort can only be achieved when the utmost care is taken over every detail.

Anatomically contoured seats

Bad seats can cause irrevocable physical damage. This is why all MB seats have been developed in co-operation with medical consultants. Our seats have the following characteristics:

- **Good permeability to air and humidity**

  Fig. 51 clearly shows the semi-fluted upholstery (marked in brown) filled



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with special cotton wool, separated by seams. The resulting channels make for good permeability to air and humidity.

The other elements of the seat (a = rubber fibre padding, b = interlocking steel spring cores) also guarantee excellent seat ventilation.

● **Firm seats are better than soft ones**

To prevent signs of congestion in the human body, it is important that one is able to change one's position on the seat from time to time, be it only by a few millimeters or centimeters. For this purpose, a firm seat is better suited than a very soft one, which always clings to the human body in the same way and brings no relief whatsoever. Whereas the firm seat avoids vibrations, the impulses transferred from soft upholstery to the body fade only after many vibrations.

● **Anatomically contoured seats support the body**

The MB seat reduces damage to the spinal column, since the S-shaped line of the backrest exactly follows the spine and supports the lumbar vertebrae which are particularly strained when sitting.

The supporting function of the car seat can only be effective, if the body does not constantly swing up and down and does not rub against the backrest. For this reason we use firm upholstery.

● **Bucket-shaped curvatures for side support**

Seat surface and backrest are bucket-shaped, which gives the body excellent side support. With insufficiently shaped or too soft seats, the driver even has to cling to the steering wheel in order to avoid sliding to and fro during cornering.

Apart from the physical strain, this cramped position on the part of the driver may lead to badly timed or incorrect action.

● **Three adjustments**

The front seats have fore and aft, vertical and backrest angle adjustment.

Fig. 52 shows the upholstery versions available:

a = standard fabric upholstery
b = velours or plaid upholstery
c = Pullman version

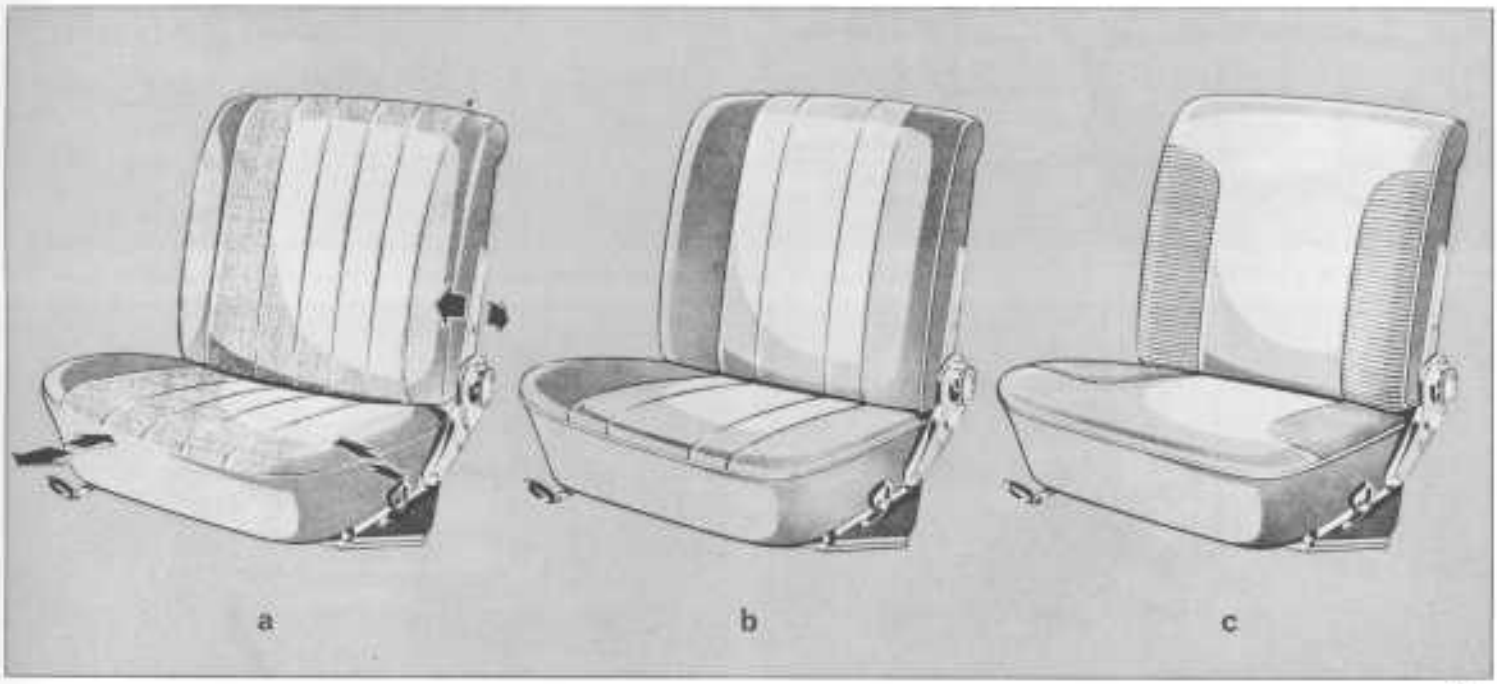
Leather and leatherette upholstery versions as "a".

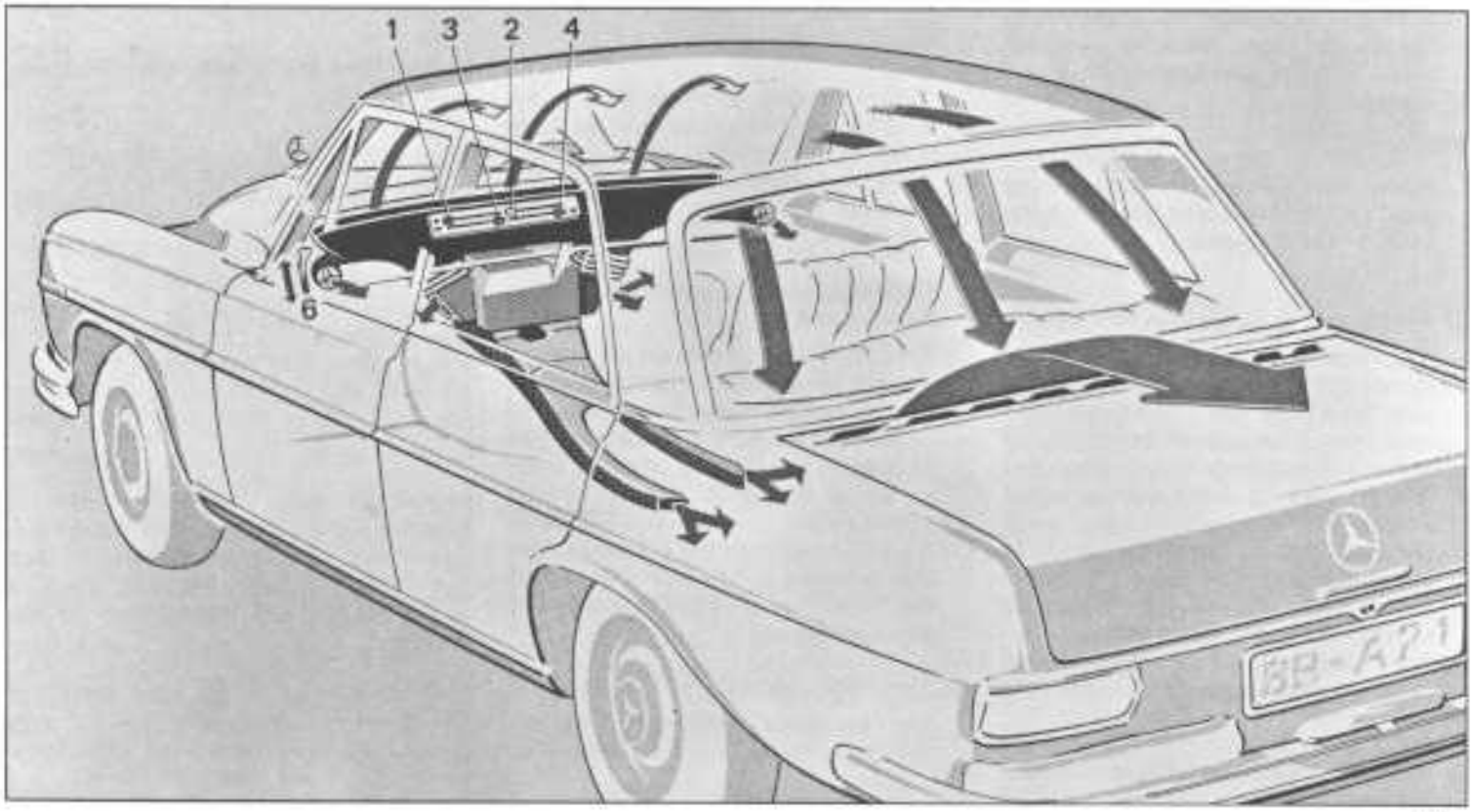
Easy handling

Should the situation require it, the driver must be able to concentrate completely on the traffic without being distracted by the handling of the car. This, however, is only possible, if all instruments are clearly arranged and easy to read and the functional controls lie within easy reach of the driver.

Recently a motor journalist wrote: "In America stylists decide what dashboard, instruments and switches have to look like. At Daimler-Benz, however, one tries to suit design and arrangement to the function."

Even after hours on the road the driver should not feel tired. This does not only depend on such factors as upholstery, ventilation, noise development etc., but also on the ease of handling.





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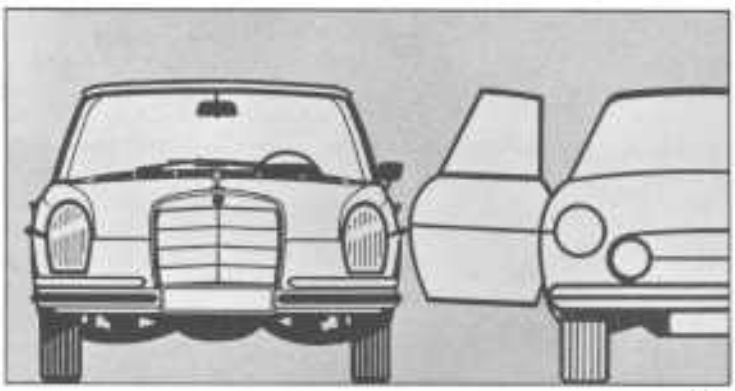
High rate of fresh air

Fresh air comes in through a wide opening in front of the windscreen, passes through a filter and is then led into the passenger compartment. By means of a three-stage blower, the vehicle can also be ventilated when stationary.

The amount of fresh air is infinitely variable by adjusting the blue lever (fig. 53). With lever 2 the air stream can be directed upwards or downwards, or blended. Through the summer ventilation (lever 6) additional fresh air is directly led into the



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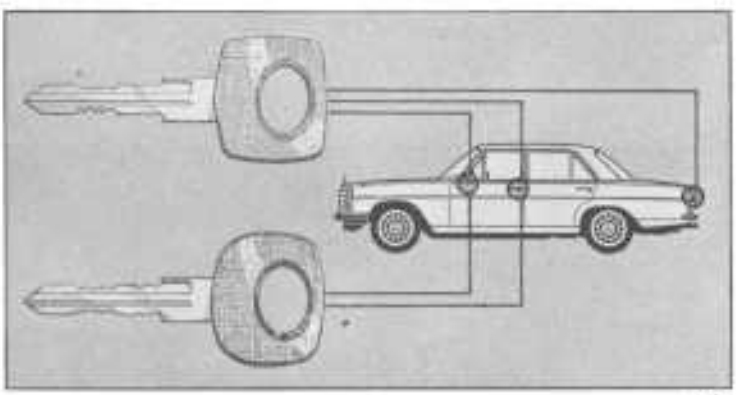

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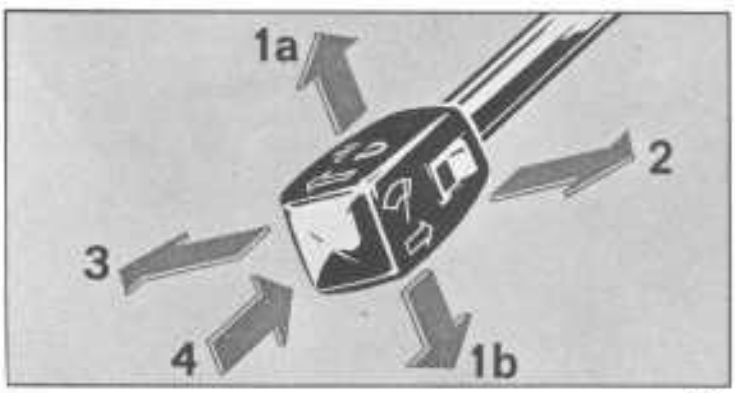

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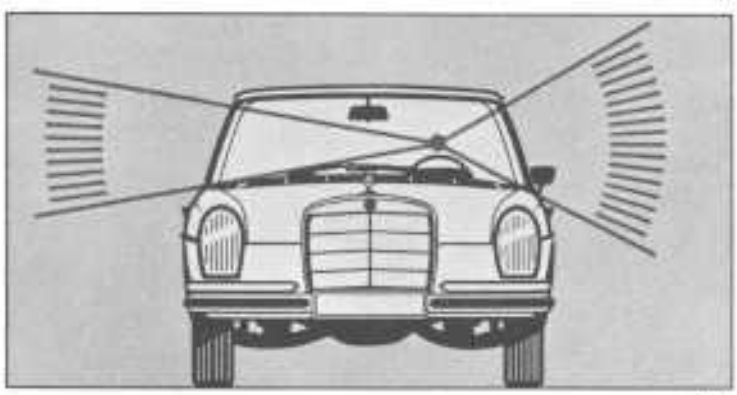

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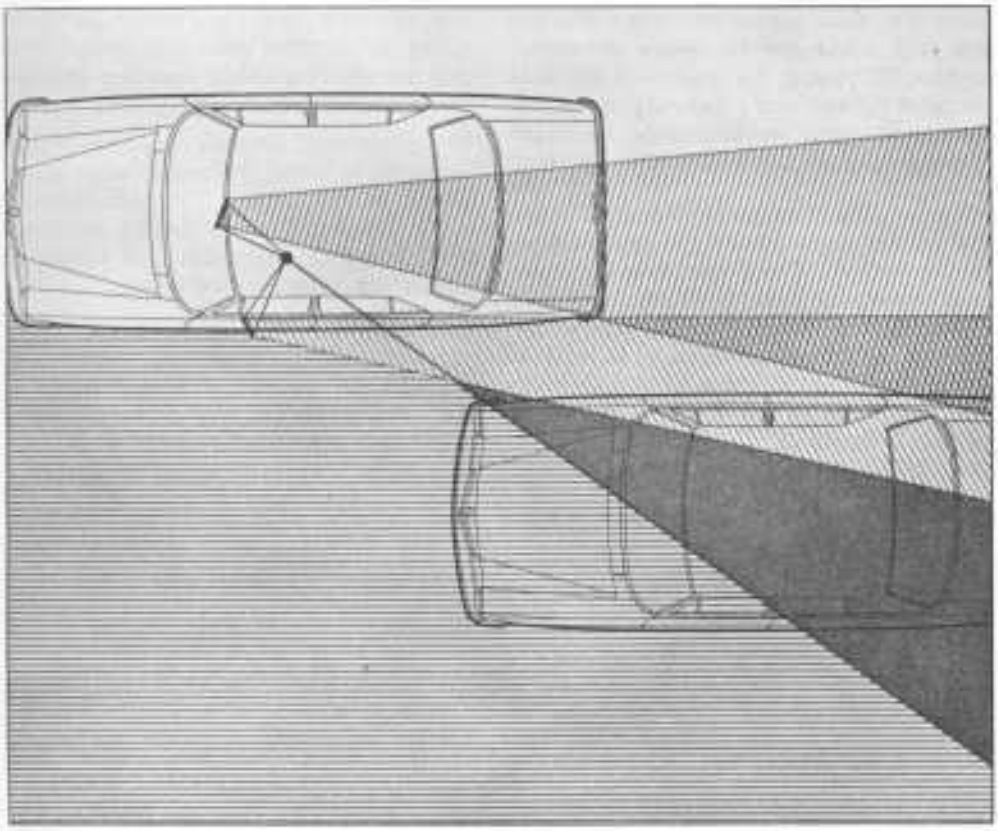

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interior of the car. The air stream can be adjusted over a wide range through the adjustable nozzle.

The device for continuous draft-free ventilation of the interior has been accommodated below the rear pane, which results in a clear rear window. The stale air escapes through a slit between luggage compartment lid and car body.

Precisely variable heating

The left red lever (3) controls the heating for the left side of the car, the right lever (4) for the right-hand side. In this way driver and passenger are able to control the temperature independently of each other. This is important, since the driver requires different conditions from the passenger who is relaxing.

Special functional characteristics

- Practical locking system with master and second key (symmetrical bits). Central locking system via driver's door lock can be supplied on special request (300 SEL and 300 SEL 6.3 standard).
- Combination switch incorporating blinkers (1 a, b), high beam (3) headlight flasher (2) and windshield washer (4).
- Electrically operated sliding roof and window lifts optional (electric window lifts in the 300 SEL and 300 SEL 6.3 standard).
- Foot-operated windshield washer, combined with wipers. With an electrically-operated windscreen washer the water jet could not be directed on to dirtier sections of the windscreen.
- Protective rubber strips prevent damage caused by other vehicles (fig. 54).
- All doors are equipped with safety tap locks (fig. 59); rear doors with child-proof locking system.
- The signal of the two super tone horns is particularly intense straight ahead, as the oscillations are sharply defined and result in a solid pencil beam. This is the reason why the signal cannot be heard in all its force by the driver and co-driver.
- Windshield made of multi-layer glass. 2 glass panes are insolubly connected by means of plastic material. If the windshield breaks, the elastic layer in between keeps the glass splinters together thus preventing injuries. If fractured, the glass no longer has the transparent "crazed" structure, but the patches are comparatively longer similar to cracks in window glass.

Good all-round vision

The driver should be able to survey the whole scene without having to change his position. This is why there is scarcely a blind spot for the Mercedes-Benz driver (Fig. 57).

- The slender pillars barely obstruct the view. They are nevertheless made strong enough so that, in the event of the car rolling over, they act as a roll-over frame.
- The low belt line and the high roof ensure large window areas and thus excellent vision upwards and downwards. Traffic lights as well as steep mountain roads are seen and noted by the driver at a glance.
- The rear-view mirrors are arranged in such a way that almost the entire road lies within the driver's angle of vision (fig. 58).

  The position of the exterior rear view mirror on the driver's door results in a favourable angle of view, since it is relatively close to the eye of the driver, thus reducing the danger of glare when driving at night. It is true that the driver has to turn the head further to the side, as would be necessary with a mirror mounted on the fender, but peripheral vision will enable him to see a larger section of the blind spot.

Are 3.307 lbs. (1.500 kg) too weighty?

Now and then a customer asks whether the MB could not be made somewhat lighter. Of course, our engineers are able to build lighter cars – but only at the expense of good workmanship, excellent driving qualities and outstanding comfort.

The standard hydro-pneumatic compensating spring, the wide high-speed tires and the steering shock absorber account for additional weight.

The permanent underfloor protection of the vehicle with PVC and wax alone weighs 31 lbs. (14 kg). The material used for insulating the passenger compartment, too, makes for additional weight, as well as the large window areas.

A Mercedes-Benz can be driven safely and effortlessly even at speeds of 112 mph (180 km/h) and more because of the careful design and thorough workmanship of even the smallest detail.

280 S/280 SE/300 SEL (European version)

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300 SEL 6.3 (European version)

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