New from Sweden:

VOLVO 240 & 264

New engines, new front suspension & smoother front ends are featured in Volvo's 1975s for the home market

BY PAUL FRÈRE

VOLVO HAS ANNOUNCED its most extensive model change since the introduction of the 140 range of cars nearly 10 years ago. Although the new cars do not look very different from what they used to be, except for a restyled new front end with considerably more harmoniously integrated 5-mph bumpers, what is under the skin is almost entirely new and notably inspired by Volvo's Experimental Safety Vehicle. The body shell itself is completely redesigned from the bulkhead forward, partly for even better energy absorption in the case of a crash but mainly to take a new MacPherson front suspension and steering mechanism. Though the cheapest models still use the B20 pushrod engine, the other 4-cylinder models have a completely new 2.1-liter engine with a crossflow aluminum head and a cogbelt-driven overhead camshaft, and the modified shell will also take a completely new ohc V-6 engine of 2.7-liter capacity. The V-6 car will replace the 164E on most markets but not in the U.S.; here the new V-6 will not be marketed in 1975 and the 164E is still being produced with some minor changes, mainly trim and seats. The new 4-cyl models are called the 240 series (242 two-door, 244 four-door and 245 station wagon) and the V-6, made only in four-door form, is the 264. The 240-series cars will be sold in the U.S. as 1975 models, but only with the well proven B20F 2-liter pushrod engine to U.S. specifications, using the Bosch continuous-flow fuel injection system as in 1974.

The main chassis modification is replacement of the transverse A-arm front suspension by a MacPherson layout to give improved geometry, a wider track of 55.9 in., increased travel and softer springing as well as provide more room under the hood. The layout is quite straightforward with the struts inclined rearward 1.5 degree to provide the necessary caster. The lower links are triangular A-arms with a wide base, allowing the use of large soft rubber bushings on the pivot points to effectively absorb road noise without excessive unintended movement of the wheels. The front anti-roll bar thus serves only its own purpose and is not used as a locating element. In view of the sensitivity of MacPherson suspension to wheel unbalance and eccentricity, a boss on the hub (rather than the wheel securing bolts) centers the wheel and the eccentricity of the rim is kept to very close tolerances. The spring rate, measured at the wheel, is 256 lb/in. instead of 317 in last year's models, springing thus being some 20 percent softer than before.

With the new front suspension goes completely new rack-and-pinion steering replacing the former worm-and-roller system, giving an overall ratio of 21.5:1 and 3.5 turns of the wheel between widely spaced locks. In the V-6 model the plain rack-and-pinion steering is replaced by a hydraulically assisted version with a ratio of 16.5:1 made under Cam Gear patents; this power steering is also available on the top versions of the 4-cyl cars. Wheel and tire sizes have also been changed: rim diameter is now 14 in. instead of 15, but fatter radial tires are used. In the GL models, both 4-cyl and V-6, 185/70HR-14 tires are used on 5½-in. rims; L and DL models have 175HR-14 tires on 5-in. rims.

The rear suspension has also been developed further as well as being matched to the new front end. In side view the trailing arms and upper torque-reaction arms are farther apart than before, so there is more leverage to absorb driving and braking

torques, and the rubber bushings have been made softer in the interest of road-noise absorption and longitudinal compliance.

The brakes (discs all around) are still operated by twin circuits, each of them acting on one rear and both front wheels, but thanks to the use of a stepped master cylinder and piston the pressure required on the pedal for a given retardation remains unaltered with failure of one circuit.

Two New Engines

LET'S NOW turn to the new power units, to be offered only on European markets for the coming year. The new 2.1-liter four is more beefy than its already durable forerunner, which started life as a 1.4-liter unit 30 years ago. It is not heavier, however (330 lb), thanks to the use of an aluminum-alloy cylinder head. The new engine has five bearings, as did its forerunner, and its bores are entirely surrounded by cooling water. The stroke has been kept at 80 mm, the bore increased to 92 mm for a total capacity of 2127 cc. To make more room for the induction system the block is tilted about 15 deg to the right; the crossflow head has its valves parallel to the cylinder axis. The combustion chambers are roughly of the inverted-tub type with a considerable squish zone. A cogbelt-driven camshaft operates the valves via bucket tappets, adjustment being by large shims on top of the tappets as in Fiat engines. The cogbelt also drives an intermediate shaft for the oil pump, ignition, distributor and, in the case of the carburetor engine, the fuel pump. This, called B21A, is the lower-powered of the two variants offered, using a constant-depression Stromberg carburetor and an 8.5:1 compression ratio. The other variant is the B21E, fed by Bosch continuous-flow injection and developing 117 bhp SAE net at 5500 rpm with a 9.3:1 compression ratio. For this higher-performance engine a breakerless capacitive-discharge ignition system is specified.

With the 4-cyl engines the transmissions are very much as before, a Volvo 4-speed box being standard and an overdrive (the switch is now in the gear-lever knob) or the Borg-Warner 3-speed automatic optional.

The 4-cyl engine is entirely Volvo's own development, but the V-6 was born in France as a common Peugeot-Renault project in which Volvo joined at a later date. It is actually manufactured in France. All the main castings being aluminum, it has the merit of being no heavier than the four, so that either engine will fit without creating weight-distribution problems. This V-6 is of 90-deg configuration to provide more space for the induction system, at the cost of a slightly irregular firing order but not of balance. Wet liners are used in the alloy block, a technique with which both Renault and Peugeot are familiar, and the valves are set in V-formation in roughly hemispherical combustion chambers with shrunk-in seats. Each head carries a separate cam box in which the camshaft runs in four bearings and operates the valves through rockers with a screw at the valve end to adjust the clearance. The camshafts are each driven by a long hydraulically tensioned single-row chain from the front end of the four-bearing crankshaft; a third, shorter chain drives the gear oil pump. The ignition distributor for the breakerless CD system is driven off the righthand camshaft.

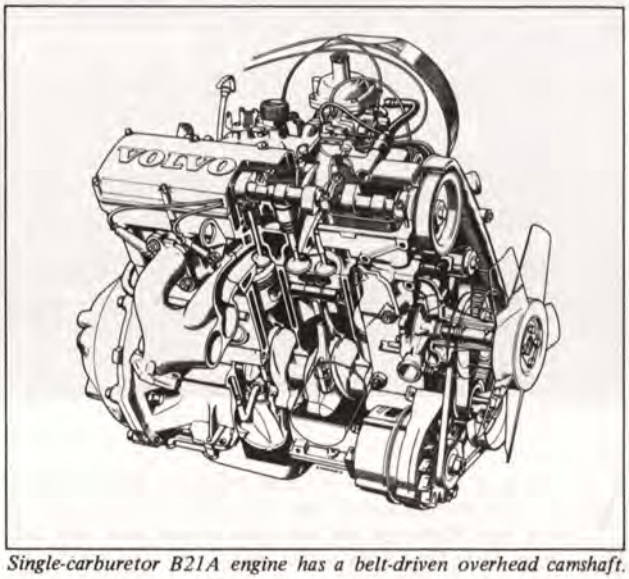
For this engine an exceptionally neat and compact version of the continuous-flow Bosch injection system has been devised, the entire unit fitting neatly into the V of the block and being entirely surrounded by the huge air filter. With bore and stroke dimensions of 88 x 73 mm the engine has a capacity of 2660 cc. A compression ratio of 8.7:1 gives an octane requirement of 93 and the power output is 133 bhp at 6000 rpm with a maximum torque of 150 lb-ft at 3000 rpm.

To match the V-6 engine, proprietary transmissions are used. Here the choices are a manual 4-speed box, a manual 5-speed and a 3-speed automatic. Both the manual boxes are of Getrag manufacture and both have direct drive in top gear, closer spacings being the main merit of the 5-speed box. The automatic is the new Borg-Warner Type 55, which has quicker and smoother response than the Type 35 and has the important advantage that kickdown will engage 1st gear at anything below 25 mph with the selector in the D position.

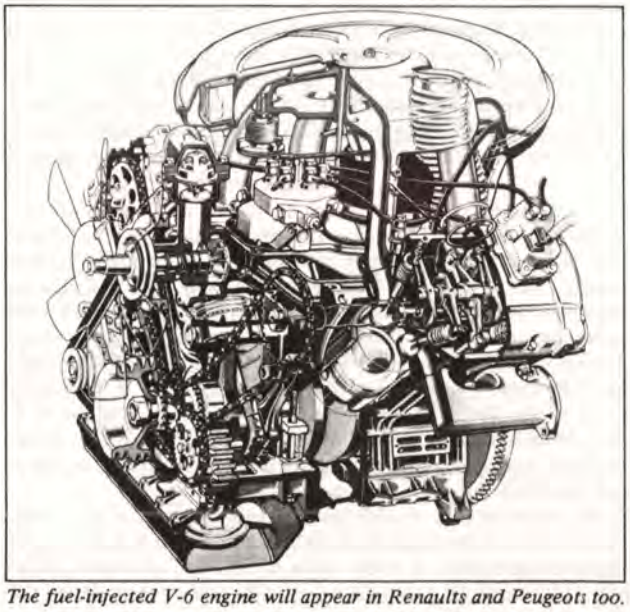
Except for the restyled front end, with a different grille treatment for the 4- and 6-cyl cars, body changes are mainly concerned with the interior trim and new front seats with an adjustment for height in the case of the driver's seat. The 264 has headlight wiper-washers as standard and these are also available on the 4-cyl models. Air conditioning is an option with all engines and the U.S. versions have their bumpers mounted on energy-absorbing hydraulic struts instead of the rubber buffers used in Europe.

Driving Impressions

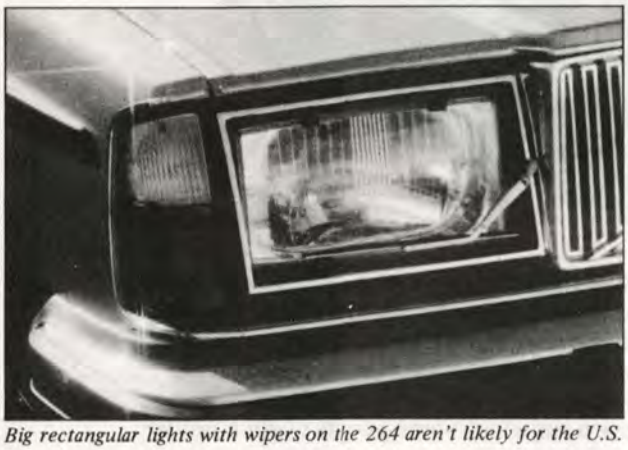
I HAD an opportunity to drive several versions of the 264 on the factory's small production test track and a B21A-engine 244DL over nearly 200 miles of varied Swedish roads. The main fact that emerges is that to the well-known secondary safety of the cars Volvo has now added vastly improved primary safety factors. The new models handle much better than their predecessors while being more comfortable. Gone is that monumental understeer, and the new rack-and-pinion steering has excellent feel for normal and fast driving though it is still quite heavy for maneuvering and sharp turns. Swedish



Single-carburetor B21A engine has a belt-driven overhead camshaft.



The fuel-injected V-6 engine will appear in Renaults and Peugeots too.



Big rectangular lights with wipers on the 264 aren't likely for the U.S.

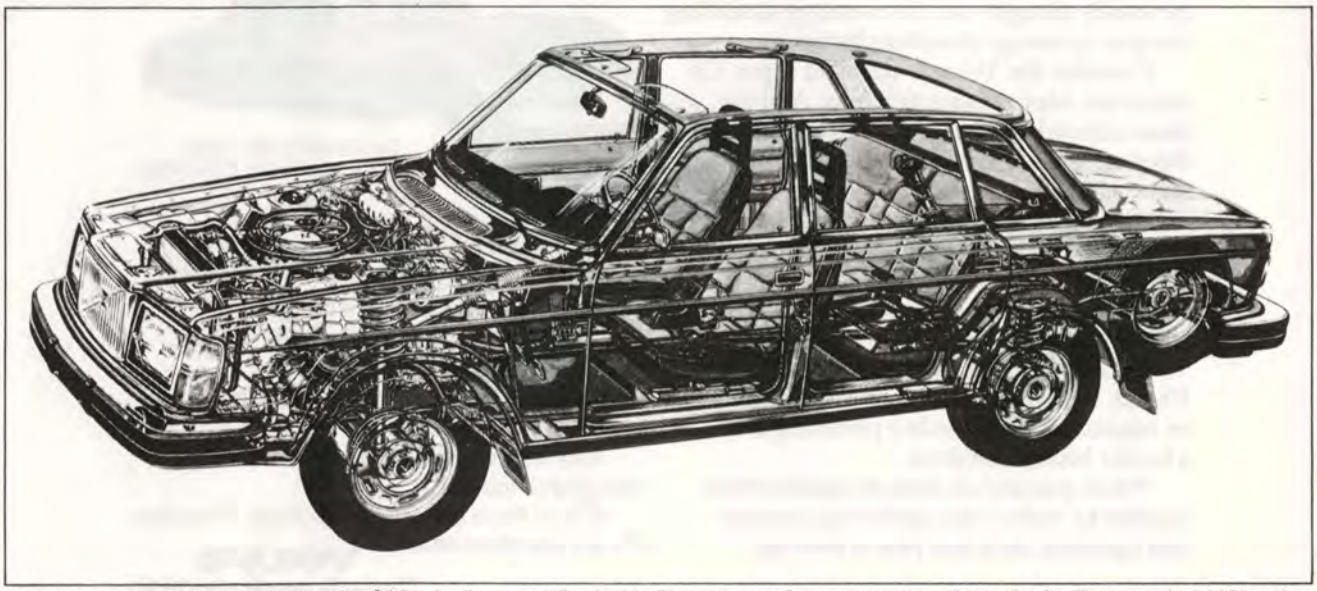
main roads are very deceptive: their good surface finish makes them look quite smooth, but they are far from it. There was quite a lot of up-and-down motion at speed, though the movements are quite smooth and reasonably well damped. In fact, on more normal roads (by European standards) the car should be really comfortable, and for a model that has no pretension of being sporting a good compromise has been struck between handling and comfort. Some shake can be felt on indifferent surfaces, apparently induced by the comparatively heavy rigid rear axle, and fast cornering produces a fair amount of roll. But the car can be cornered quite fast and there is just the right amount of attitude change toward oversteer if the loud pedal is lifted while cornering fast.

For a big four the B21A engine is pleasantly smooth and silent as long as you don't push it too far up the range, which is quite unnecessary anyway as it's a real workhorse with a lot of low-speed torque and no particular eagerness to rev. In top gear the car remains pleasantly quiet up to an indicated 87 mph, when some booming sets in, so 85 seems to be the ideal speed for all-day motorway cruising.

I tried the V-6 with both 5-speed manual and automatic transmissions and found it much more pleasant with the latter. With the 5-speed (and there is no reason that this should not apply to the 4-speed box) quite a lot of roughness can be noticed when accelerating hard in a low gear; 6-cylinder smoothness is enjoyed only once a steady cruising speed has been reached. Of course, the V-6 is noticeably livelier than the four and a rough timing indicates the 0-to-60 time should be between 12 and 13 seconds. Another bad feature of the 5-speed gearbox is vague gear selection, there being practically no self-centering of the gear lever in the middle plane (2nd and 3rd gears).

The new Type 55 Borg-Warner is quite a contrast. The torque converter smooths all the roughness, and the transmission itself is an excellent unit providing smooth changes in all circumstances and responding quickly and intelligently to the driver's action. In D position, 2nd can be obtained by kickdown up to 63 mph and is selected at part-throttle lower down the speed range; 1st can be selected by kicking down at speeds up to 25 mph, or as high as 37 mph by moving the selector into L position. Above that speed a safety valve prevents the selection of 1st gear.

Though in the V-6 engine too the accent is mainly on pulling power, it revs quite freely though not particularly smoothly for a six, up to the safe 6000-rpm limit. The 264 is certainly more a driver's car than the 164E, though it is probably not quite as fast and not quite as refined as its straight-6 predecessor.



Cutaway drawing shows new engineering fairly clearly, especially the MacPherson-strut front suspension. This is the for-Europe-only 264GL sedan.