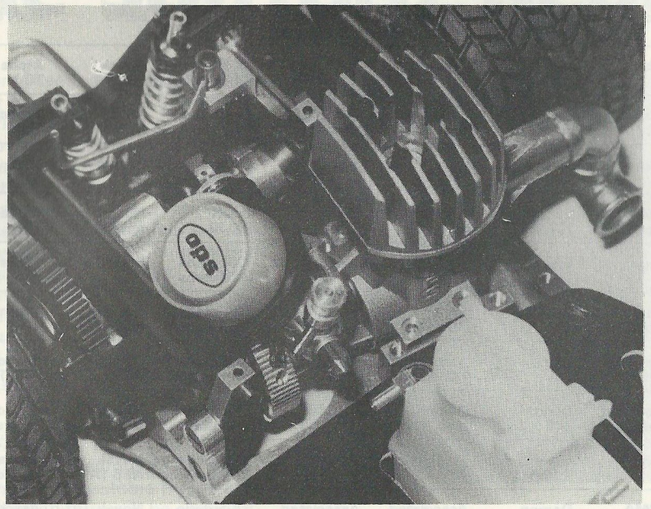
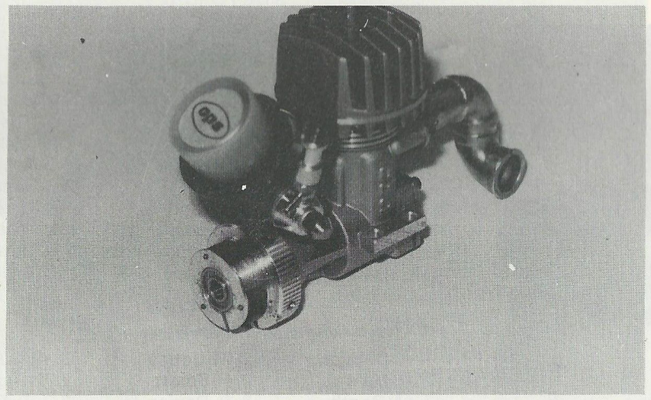
The Delta Eagle

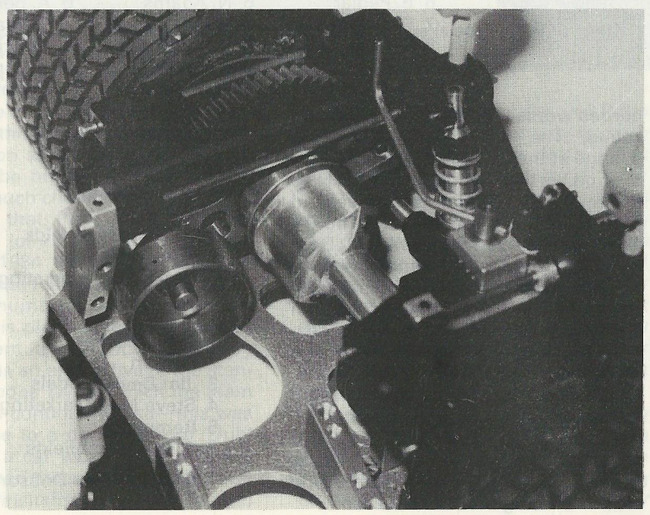
by Nic Marson



OPS engine and homemade manifold shown in place.



Unsprung Rulon clutch shoes shown fitted to flywheel.



View of rear end, engine not fitted showing clutch ball housing supported in rear hanger. Considerable weight reduction evident in power pod and diff. housing.

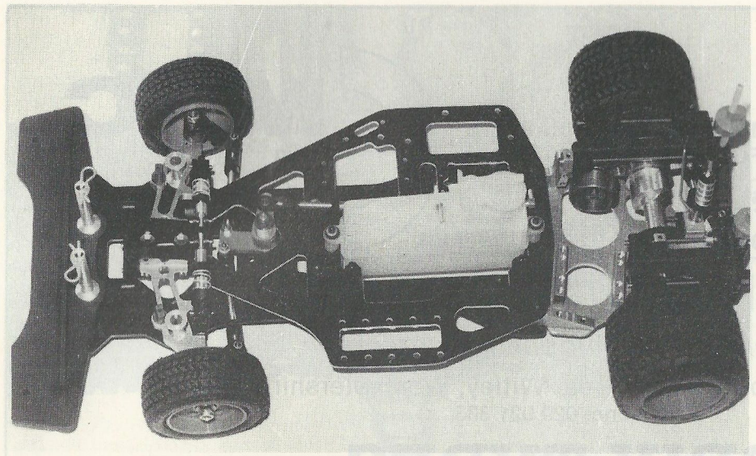
It was with eager anticipation that I awaited the arrival of the review Eagle. I was somewhat bemused when presented with a small plain cardboard box. Was this it, or was this the accessory box? This was it! Delta most certainly haven't capitalised on the potential advertising space available on the lid. One can hardly imagine this box commanding the place of honour in any model shop's display case.

On opening the box I was confronted with numerous plastic bags containing all the components. The quality of the machined, or should I say sculptured, aluminium parts is nothing short of excellent. The few plastic moulded components are black, feel very solid and I suspect are glass filled nylon. The instructions consist of six large highly detailed 3.D exploded drawings with step-by-step instructions for ease of construction. In addition there is a separate document on assembling the Delta which contains a list of tools required, hints on assembling the Delta and an errata sheet. Having built the Delta another booklet deals in great detail on setting the car up for different track conditions, the best cornering strategy and above all the best method of overtaking! More on this later.

I was surprised by the absence of a body, aerofoil, wing wire and in particular a roll over bar.

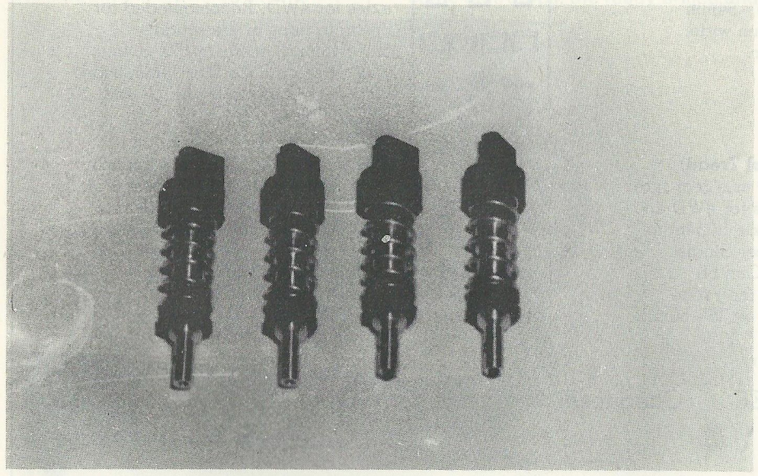
The next evening was spent reading the instructions and peering into the plastic bags. It soon became apparent that a lot of original design ideas had gone into the Delta. It most certainly is an 'out-of-the-rut' design. Delta have certainly lived up to their reputation of striving for the best solution whilst not compromising themselves by considering manufacturing cost. Other than being an 1/8th scale, with four wheels the only commonality the Delta shares with the other suspension cars is its use of hexagon ball half shafts.

Delta also supply a number of tools — a complete complement of high quality allen keys and a screwdriver for Delta's special countersunk high torque flathead screws. The benefits gained from these screws are twofold:
a) All screws are flush. This is particularly important on the underside of the chassis.
b) Countersunk screws ensure accurate and rigid assembly. Conventional straight sided holes with caphead screws require a clearance that can allow parts to be assembled with a degree of misalignment, possibly resulting in, say, a tweaked chassis.



Overview of car without engine or radio fitted.

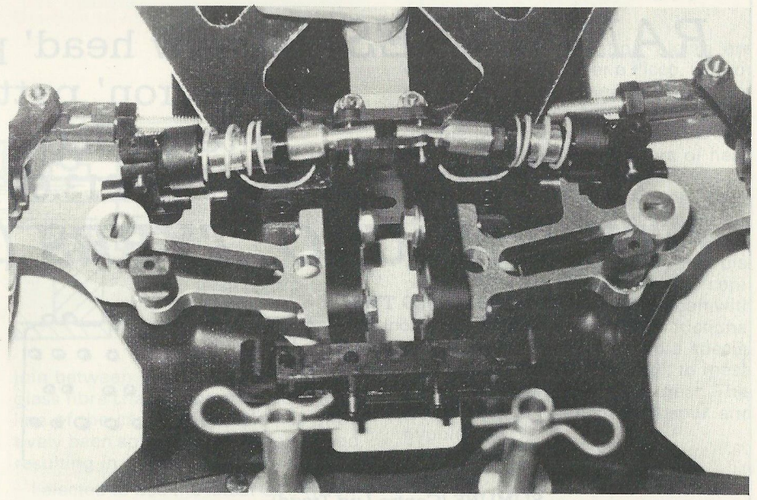
First on the assembly list are the shock absorbers. Shock absorbers are extremely important in helping the springs keep the tyres on the track surface for the maximum amount of time. The first suspension car, namely Amps, didn't have any shock absorbers. The 'conventional shock' (see RRC issue 17, page 23) suffers from cavitation — as the piston and shaft enter the cylinder an equal volume of liquid has to be displaced. As oil cannot be compressed the liquid is mixed with air. With a mixture of oil and air in the cylinder uneven piston retardation is experienced. The majority of manufacturers have addressed this problem by using constant volume shocks whereby the shaft is extended right through the oil reservoir, thus negating the need for any air. The Associated Custom Racing Shocks are an example of this.



Shock absorbers prior to fitting.

Delta have their own answer — the AVC shock. This is a non-cavitation, pressurised, automatic volumetric compensation shock! Quite simply this is a conventional shock with a lightly sprung second piston sitting on top of the oil. As the primary piston and shaft enter the cylinder the secondary piston moves up the cylinder and shaft on the oil surface, compensating for the inserted shaft volume (see diagram). The advantage of this system is that any oil seepage or expansion due to temperature changes are automatically compensated for.

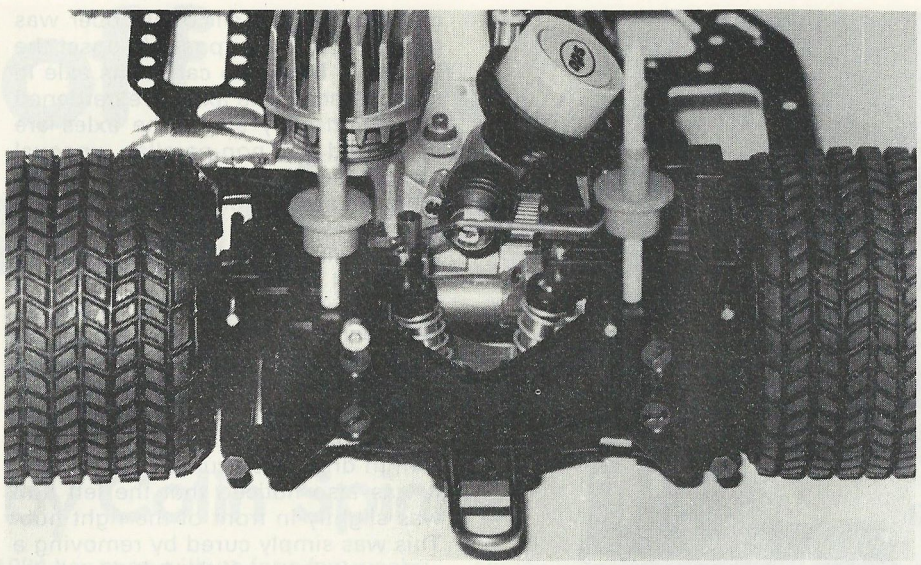
The shocks are extremely well made, very light and smooth in operation. Each shock is located inside a coil spring. A nylon nut on the outside of the body adjusts the coil spring for ride height. There is also a choice of two spring rates so that one can increase or decrease spring stiffness at



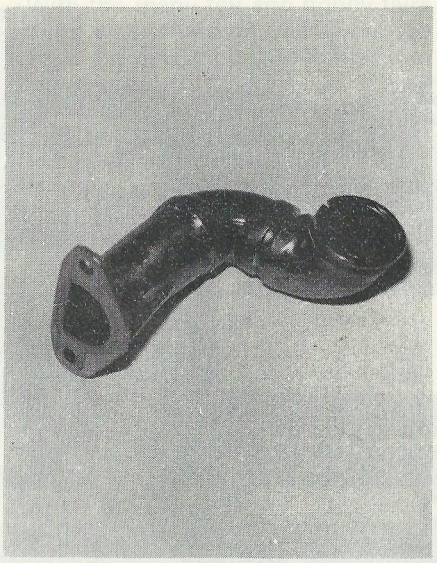
Front end. Sturdy swinging arms have been substantially lightened without compromising structural strength. Shock absorbers are shown without balloons fitted.

one or both ends of the chassis if, for example, changing from a smooth to a rough track. Four balloons are supplied to seal the shocks against the ingress of dirt.

Next on the agenda is the differential. Once again, as can be seen from the photographs, this comprises some beautifully machined aluminium components. All aluminium parts are machined from super tough 7075 T6 aircraft alloy. The diff. is of the Schumacher ball type. Unlike the 1/12 diffs. the workings are totally contained within a housing. Keeping out the dirt will obviously increase the time between servicing, in fact Delta recommend 10 hour intervals. This equates to 120 five minute heats! Two external adjustment screws are used to set the desired amount of slip.

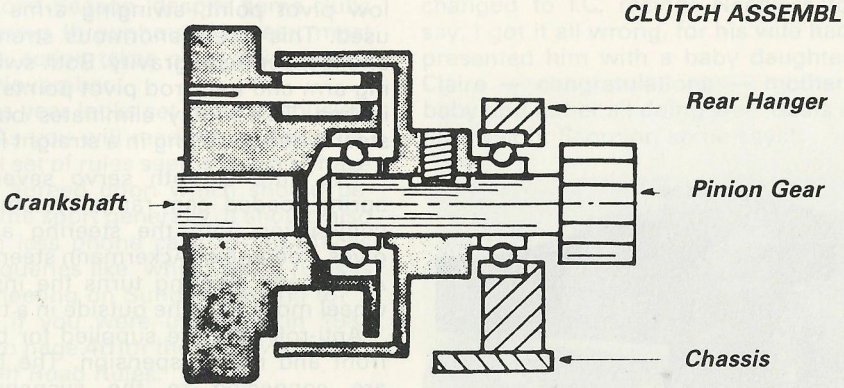


Will this become a familiar sight in 1984? M.R.C. new Cheveron G.P.'s shown fitted.



Homemade exhaust adaptor fabricated out of central heating pipe and brass plate.

CLUTCH ASSEMBLY

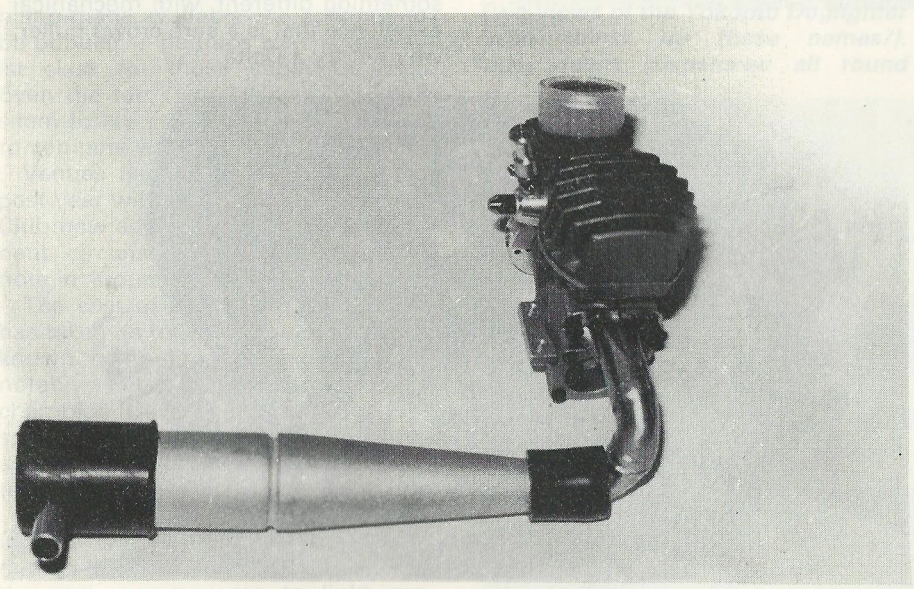


The twin disc brake is kept away from the messy end of the engine by placing it on the left hand side of the car.

The diff. support bearings and clutch/pinion support bearing are fitted to the rear hangers (plumber blocks to the English). It should be noticed from the photographs that the join between the alloy power pod and glass fibre chassis is not vertical to the line of the car. The chassis has effectively been spliced into the power pod, resulting in a more rigid structure.

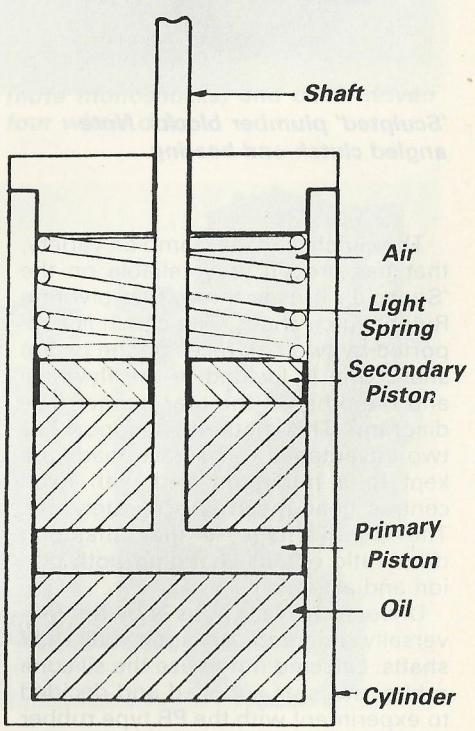
I elected to use the latest OPS RE engine along with their very powerful tuned pipe. Once again Delta have come up trumps, the ready drilled and tapped engine mounting blocks are compatible with either a Picco, OPS or KB. Unfortunately neither Delta nor OPS have produced an adaptor to enable the pipe and engine to be fitted to the car. After some 20 hours of head scratching one was produced.

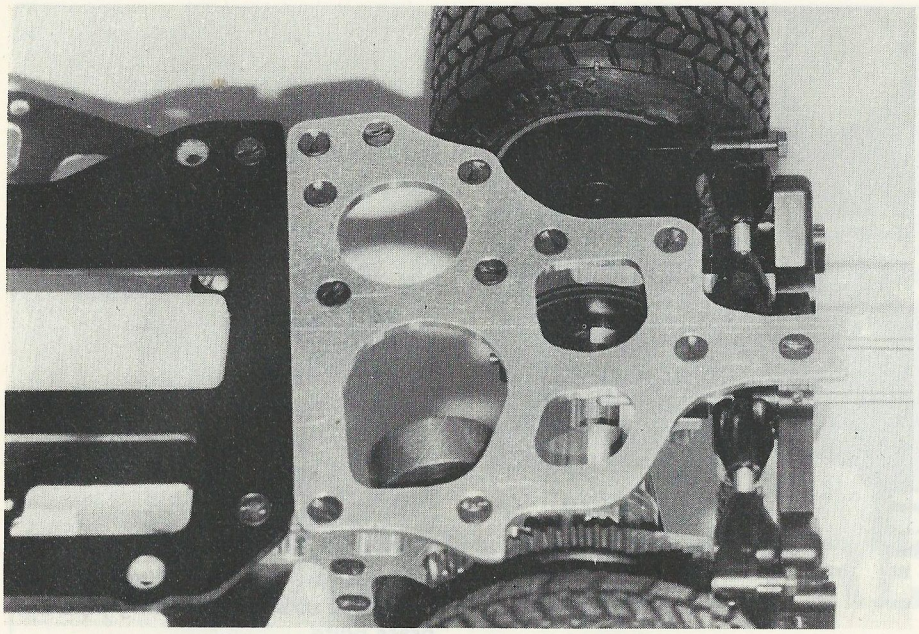
In order to reduce powerloss Delta have pioneered an anglewinder arrangement for the drivetrain, which offsets the pinion gear by 10°. This dispenses with the need for the commonly used intermediate layshaft with its associated inertial and frictional losses. Delta have designed a special main gear, 'The Moodypoid', to mesh with the straight cut pinion gear. This is in fact a combination of spur and hypoid.



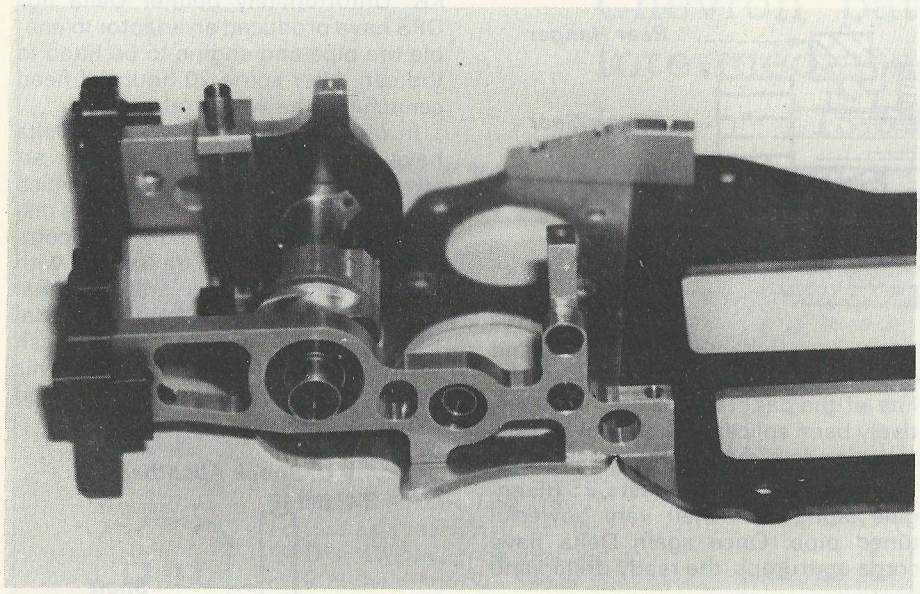
OPS, engine and pipe, powerhouse combination.

A.V.C. Shock Absorber





Underside of Delta. Note extensive Lightening holes and special screws.



'Sculpted' plumber blocks. Note angled clutch end bearing.

The clutch is of the clamp on variety, that has proved very reliable on the 'Super J'. It uses three, free pivoting Rulon clutch shoes. The clutch is supported by two ball races on the pinion shaft. One is located in the flywheel and the other in the rear hanger (see diagram). This method of support has two advantages — ballrace loads are kept to a minimum and with fixed centres gear mesh is accurately set. The disadvantage is that changing drive ratio entails changing both pinion and axle gear.

Drive to the rear hubs is by the universally adopted hexagon ball half shafts. I elected not to use the silicone rubber seals as supplied and decided to experiment with the PB type rubber gaiters. I felt the silicone rubber was too stiff and could possibly upset the handling. Each hub carries its axle in two ballraces. The axles are hardened chromium alloy steel. The axles are supported by non-parallel, unequal length, suspension arms. The top arms are conventional type wishbones and the lower is an adjustable draglink, allowing adjustment to the wheel camber.

It was at this stage of construction that I encountered my only problems. The wishbones were stiff on the pivot pins. Due to plastic shrinkage the pivot holes in the wishbone didn't line up. The holes were re-drilled with a 3.4mm drill which cured the problem. It was also noticed that the left hub was slightly in front of the right hub. This was simply cured by removing a slither of plastic off the left drag link.

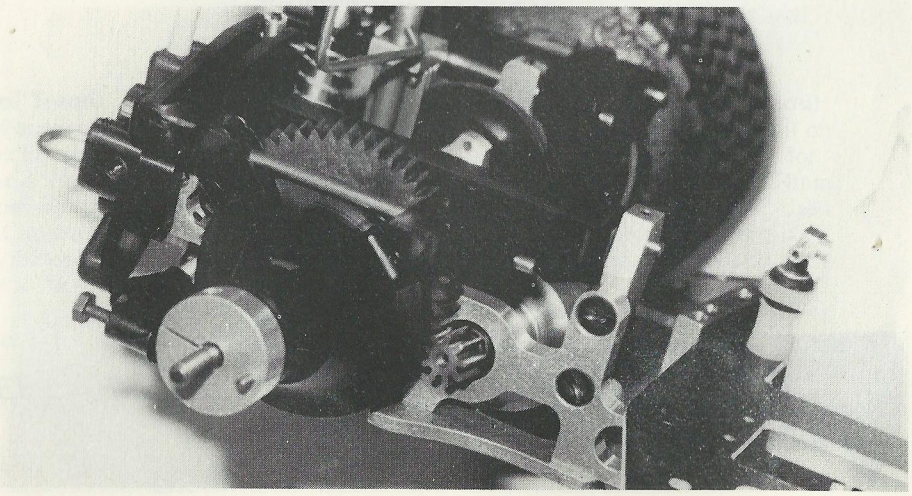
Delta have totally broken with tradition at the front end. Instead of the twin wishbone concept, long radius, low pivot point, swinging arms are used. This offers enormous strength and low centre of gravity. Both swinging arm and track rod pivot points are in line. This totally eliminates bump steer when travelling in a straight line.

The ultra smooth servo saver, a spring loaded cam-ramp system, in conjunction with the steering arms gives a degree of Ackermann steering. Ackermann steering turns the inside wheel more than the outside in a turn.

Anti-roll bars are supplied for both front and rear suspension. The bars are connected to the suspension through adjusted ball joints. There is a choice of either 1/8 inch or 3/32 inch roll bars to aid in setting the car up for the track conditions. More about this later.

In the next issue of Radio Race Car I shall be covering the radio installation, setting the car up and, if the snow and ice clears, how the car performs.

In the meantime if you want to try something different, with mechanical excellence that is a sure crowd puller, why not try a Delta.



Spur gear and Moodypoid main gear.