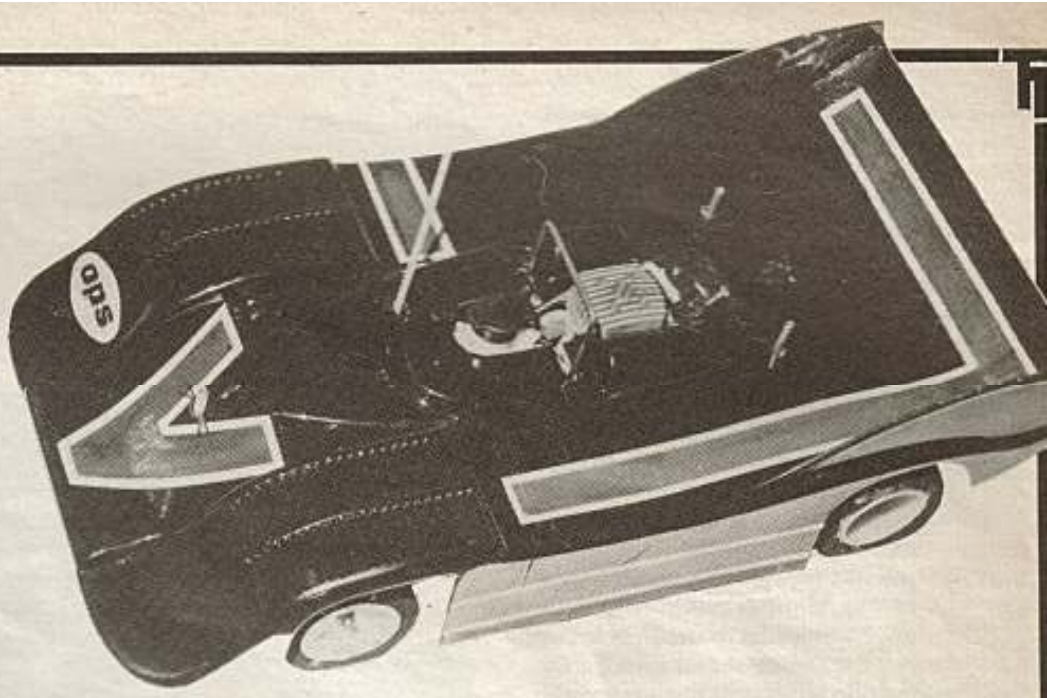
rack Test

odel Cars staff examine
e first all independent
spension car



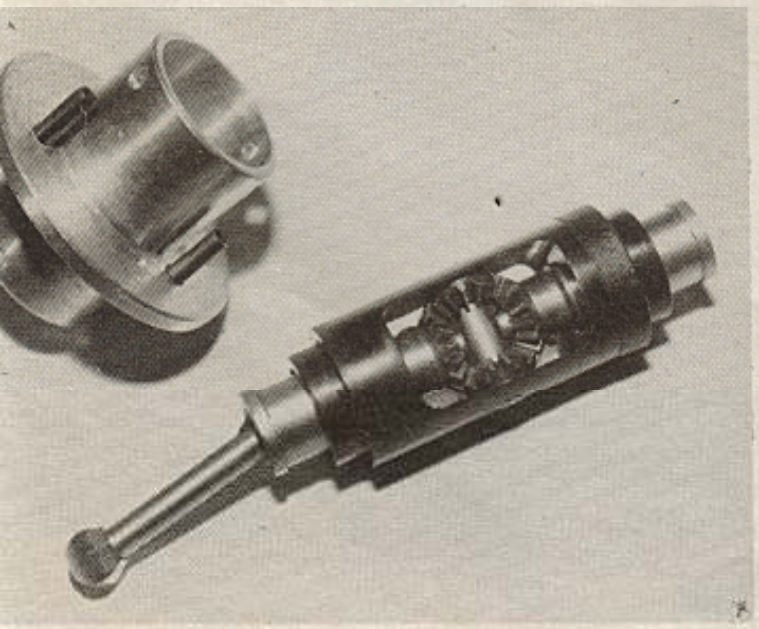
AMPS RAPIER

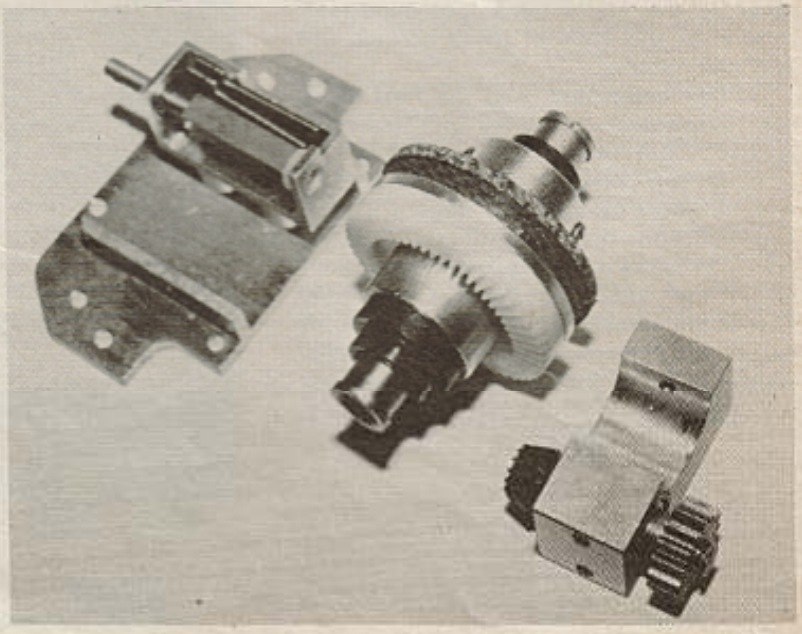
NEW MODEL PROPULSION SYSTEMS,
er known as AMPS entered R/C race
manufacturing by an interesting route.
a company who until barely three years
were almost solely involved in the
nper side of R/C modelling (witness the
npany name) to be the first on the
rket with a 1980s style independent
pension car, does pose some questions.
ollowing on from an involvement in full-
e boating, AMPS designed and
eloped a successful miniature outboard
tor unit for R/C models. Based on the
B21 motor, this unit employing as it did
h precision castings, bevel gears etc.,
s only a short step from an 1/8th scale
erential, subsequently used in prototype
m by Phil Greeno to win the Monaco
rld Cup Meeting of 1978. This dif-
ential named the 'Monaco Diff' was
rketed worldwide, establishing the name AMPS on the 1/8th scale car scene. Subsequent involvement in import of the *Serpent* 1/8th scale car, a smaller budget priced diff, the AMPS 'Mini Diff,' plus a 1/12th scale differential, further established the company name.

We have Ted Booker of the Lilford Club and Ronnie Ton of Holland to thank for the 'Rapier', for Ted, inspired by an experimental car, briefly used by Ronnie Ton in 1978, decided to build his own rear suspension equipped car. I first saw a development of this car at Lilford Park in 1979 when Ted was testing a hand-built prototype produced by AMPs, fitted with fully independent suspension. The car obviously had potential, but engine problems and suspension adjustment limitations prevented it from performing well on that occasion. Early in 1980 Ian Agnew told me that the company was to run a two, or possibly three car, team of hand built prototype cars to further develop the design with a veiw to full scale production in the Autumn of that year.

Gary Culvers and Dave Martin's exploits with the car are now 1/8th scale racing history, fastest qualification time for the 1980 Monaco World Cup for Gary, and Sports/GT class win for Dave Martin at the prestigious BRCA Nationals, with Gary as runner-up plus numerous other successes both at home and abroad. Of course, the cars raced by those two were prototypes, but lessons hard learnt in that season of solid racing at top competitive level, were all to be incorporated in the car now available as the Rapier.

Below left: differential before fitting into case, one drive shaft fitted. Pins on casing carry the brake disc. Below right: drive assembly; disc brake caliper belts onto the alloy back plate which doubles as a heat sink.





The Kit

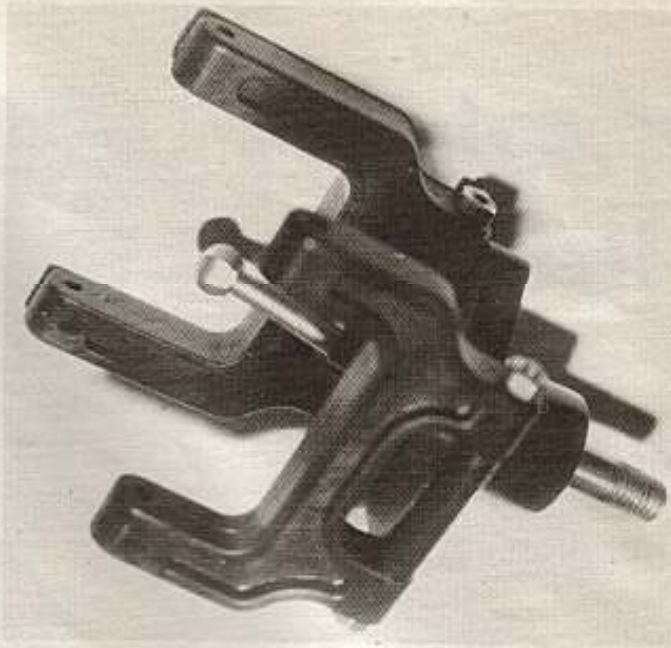
It is almost inevitable that a model as complicated as the 'Rapier' will have the odd minor deficiency in its kitting, true perfection, or least very near perfection, can be obtained, but at a price. Compared with simpler R/C car kits, there are a lot of parts included in the box for the asking price of £170, but what a pity there is no body shell or wing. I must also confess to finding it particularly annoying, as a modeller with an engineering background, to find no less than 3 thread systems (150, metric, Unified and British Association) used in the kit, a result I suppose of AMPS employing a number of 'bought-in' items. Assembling the differential is tricky, and why oh why, if any sort of alteration is made to the kit, cannot a slip be inserted in the instruction book? The replacement of two nuts on the front suspension wishbone pivot pins with 'E' clips really foxed me.

On the positive side, two different types of thread locking compound are included, an aerial tube, full R/C installation fittings set, both bumpers, and ball-races are fitted throughout the car, including the brake caliper. Instructions, backed up by a 4 page photo sheet are very comprehensive, particularly with regard to setting up the suspension. Many little hints and tips are incorporated, which assist and inform the builder.

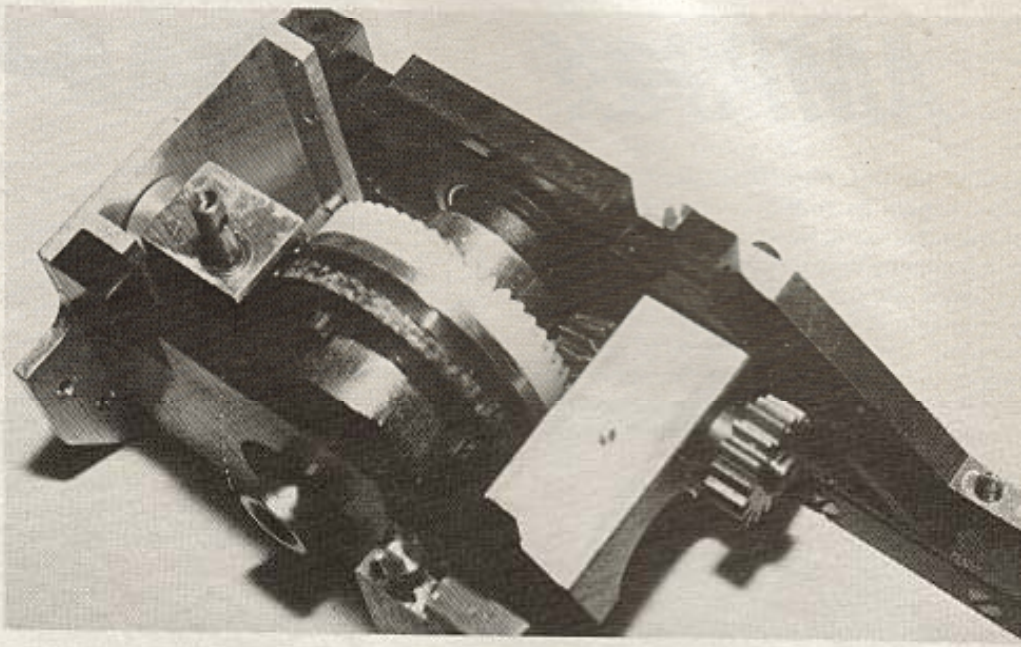
Assembly

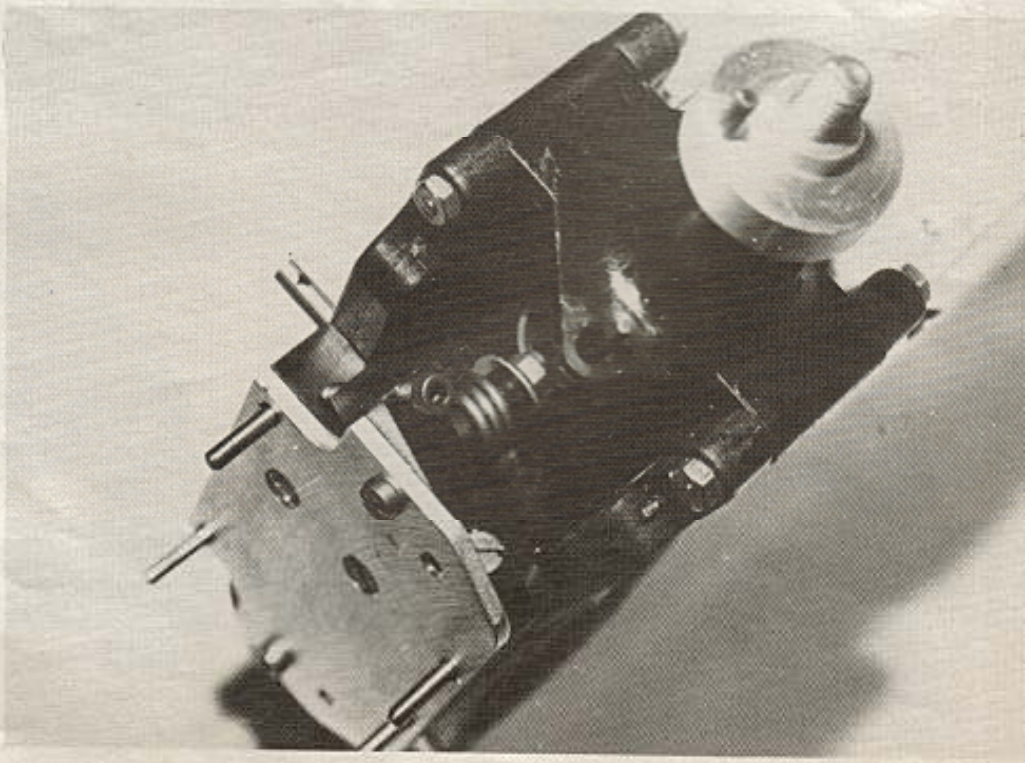
In common with most R/C car kits, parts are packed in sub-assemblies, each bag numbered to tie-up with the written instructions. Front suspension assembly is first on the list, only a minor amount of de-flashing was needed on the wishbone mouldings and substantial box section, to which the wishbones and springs are mounted. The spring adjusters have three alternative holes into which the springs can lock, it is important that holes are selected that put the adjuster screws parallel — not clear in the instructions, but important, otherwise the ends of these screws will foul one another.

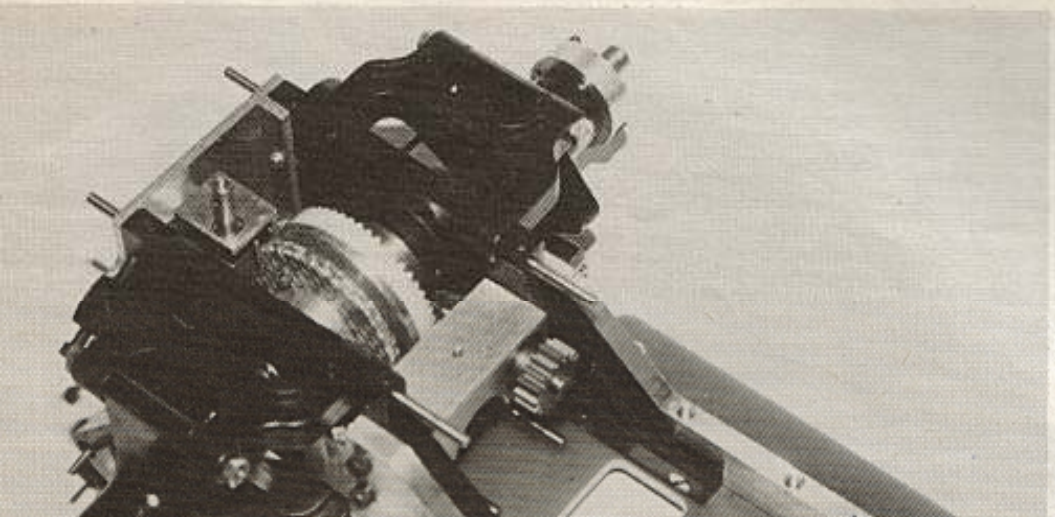
Quickly completed, and the next stage rear suspension and drive unit assembly tackled. That previously mentioned differential can present problems for anyone who has more thumbs than fingers. It is not impossible for the more nimble fingered, only a 3 minute job. I know I timed myself. I found the AMPS method of assembly impossible, choosing instead to start both half-shafts and cross spindle into their respective bearings then quite simply balance the cluster of bevels on two of my fingers, and lift them into place in the cage. 'Blue Tack' could be an answer, or plasticine, even grease, the latter, although messy, will not contaminate the gears. Once the internals of the diff are assembled, it has to be packed with grease. This may be easier if the grease is first warmed to melt it.

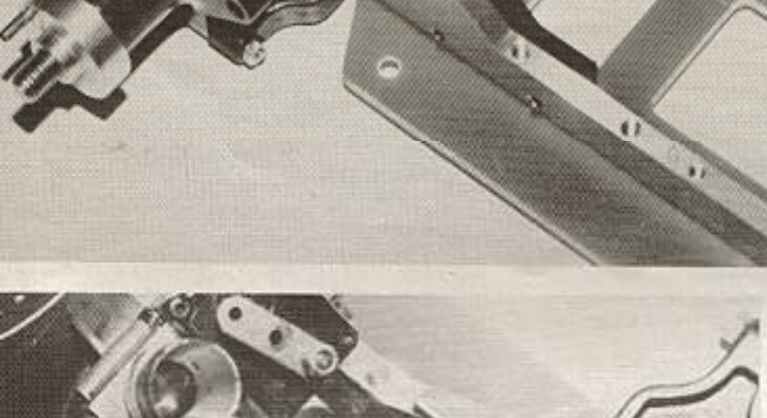


Right: rear wishbones with stub axle and drive shaft fitted. Below: drive train assembled without wishbone. Bottom rear: spring and adjuster can be seen to the rear of the wishbone.

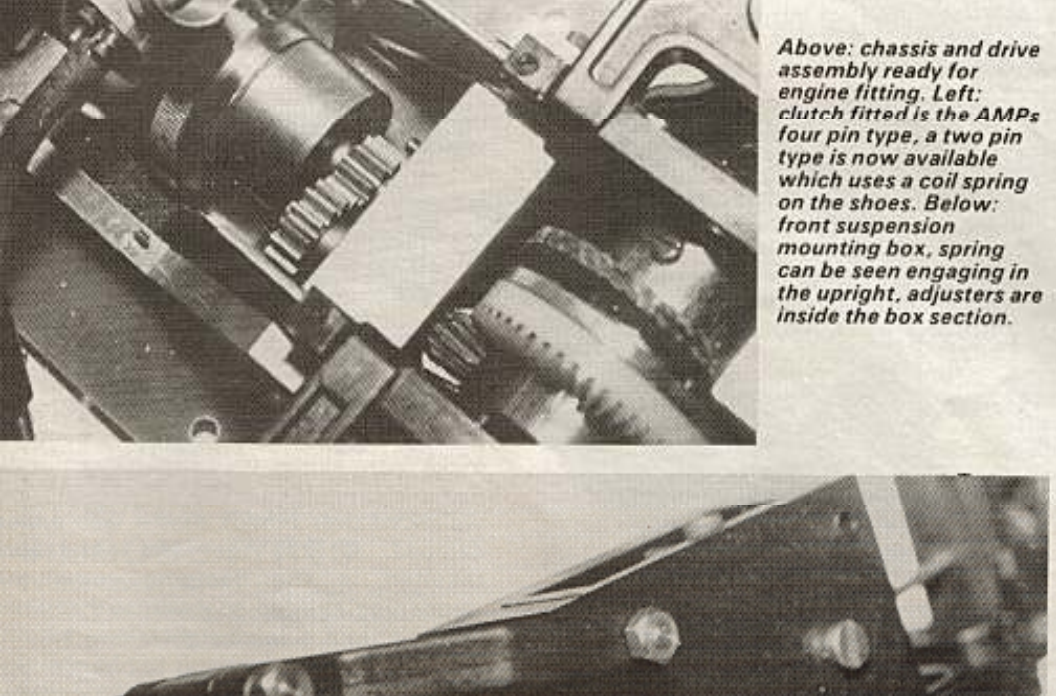








Above: chassis and drive assembly ready for engine fitting. Left: clutch fitted is the AMPs four pin type, a two pin type is now available which uses a coil spring on the shoes. Below: front suspension mounting box, spring can be seen engaging in the upright, adjusters are inside the box section.



Incidentally, there are no less than 1 ball-races in the rear drive assembly — th car has 21 in all, so once assembled the dif ferential and drive assembly runs remark ably freely considering the complication Rear suspension assembly follows alon quickly, the wishbone pivot spindles are little troublesome to fit, but a piece of hard wood and a small hammer soon drive them home. Once fitted they are locked i place with small grub screws, almos redundant I would have thought, consider ing how tight a fit the pins are; the floatin disc of the disc brake didn't float; it i essential that the disc really flops aroun on the pins, otherwise a jerky action wi result, or worse, binding-up, as the pad remain in contact with the oscillating disc Use of a file and drilling out the drive pi holes a size larger, improved brake actio immensely on my car.

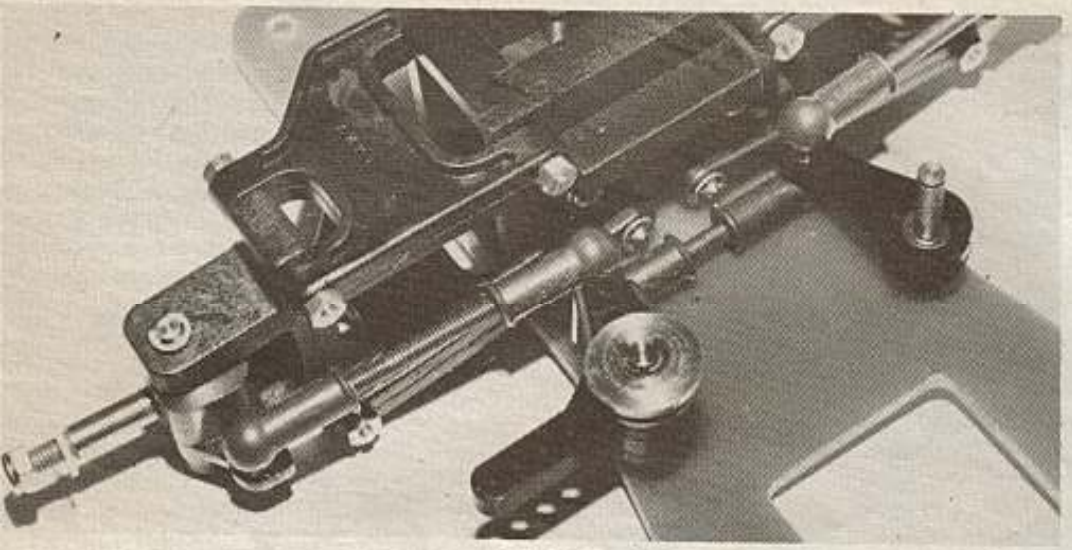
Once these front and rear sub-as semblies were complete and bolted to th lower epoxy/glass chassis plate, th 'Rapier' began to look more like a car, an attention could be devoted to the engin and clutch. I had wanted to use my nev *OS*21 but when I came to trim the crank shaft I found to my annoyance that the shaf was too hard for my hacksaw, and I had n *Dremel* grinding discs left. You've guessed it was Saturday evening. I was determine to finish the car for Sunday, so dug out a *OPS* with ready trimmed shaft. At first th clutch puzzled me — why no 'O' ring an four holes in the PTFE shoe and flywhee

If all else fails, read the instructions! Sur prise, surprise, a type of clutch new to me Instead of the shoes pivoting on a singl pin, two pins close together at one end c the shoes prevent the shoe pivoting a together.

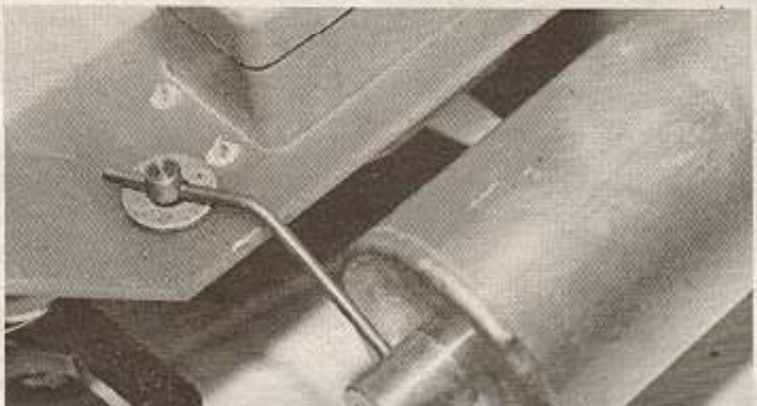
The free end of the shoe springs out wards to contact the clutch bell, engage ment speed still governed by the weight c the shoes, trim the shoes for more slip – but only in moderation. A very substantia inner ball-race is fitted and a smaller, mor usual sized race at the outer end. As ther is a double stage reduction, through th clutch, and the bevels, a larger clutch ba race is used with more material sub sequently available in the clutch bell to sup port the ball-races.

Once the clutch is fitted, the engine ca be bolted to the flat alloy mounting plate This presents an ideal opportunity to tur round the heatsink head! It's so muc easier to do up the engine bolts if socket ca types are used with the heatsink removed and in this car the engine is mounted i line, not transversely.

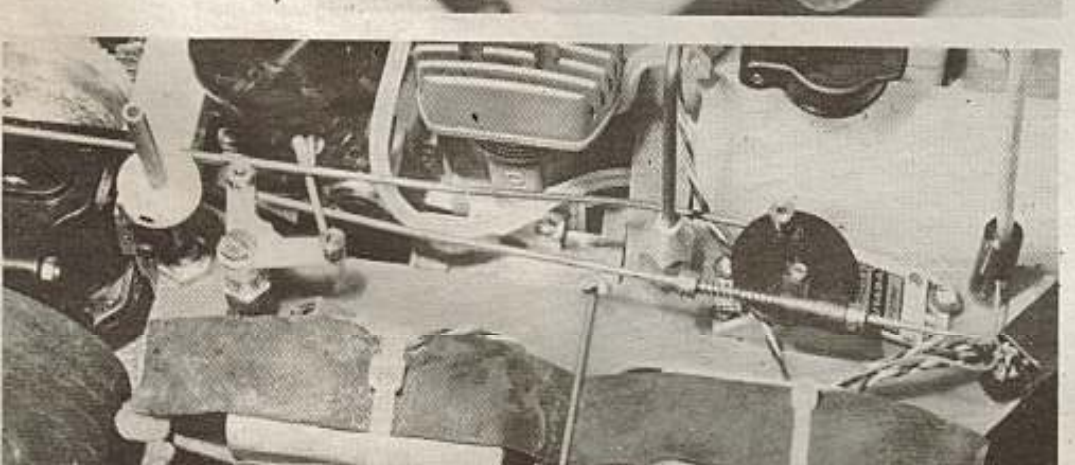
The chassis is transformed from a fla plate to a rigid box section, by addition of secondary glass/epoxy plate which carrie all the ancillary equipment, if fuel tank an R/C equipment can be considere ancillary! Cut-outs in the plate fit *Futab* 17M servos and the neat moulded plasti flip-top tank. It was necessary to make cut-out for the switch but all the remainin



Above: steering servo saver and linkage, complex arrangement necessary to allow the suspension to move without bump steering. Left: rear fixing point for the silencer.



Right: silencer front mounting point. Below: receiver and battery fixings, note the piano wire clip retaining the slice of 165-13 inner tube.



holes and cut-outs were already presen

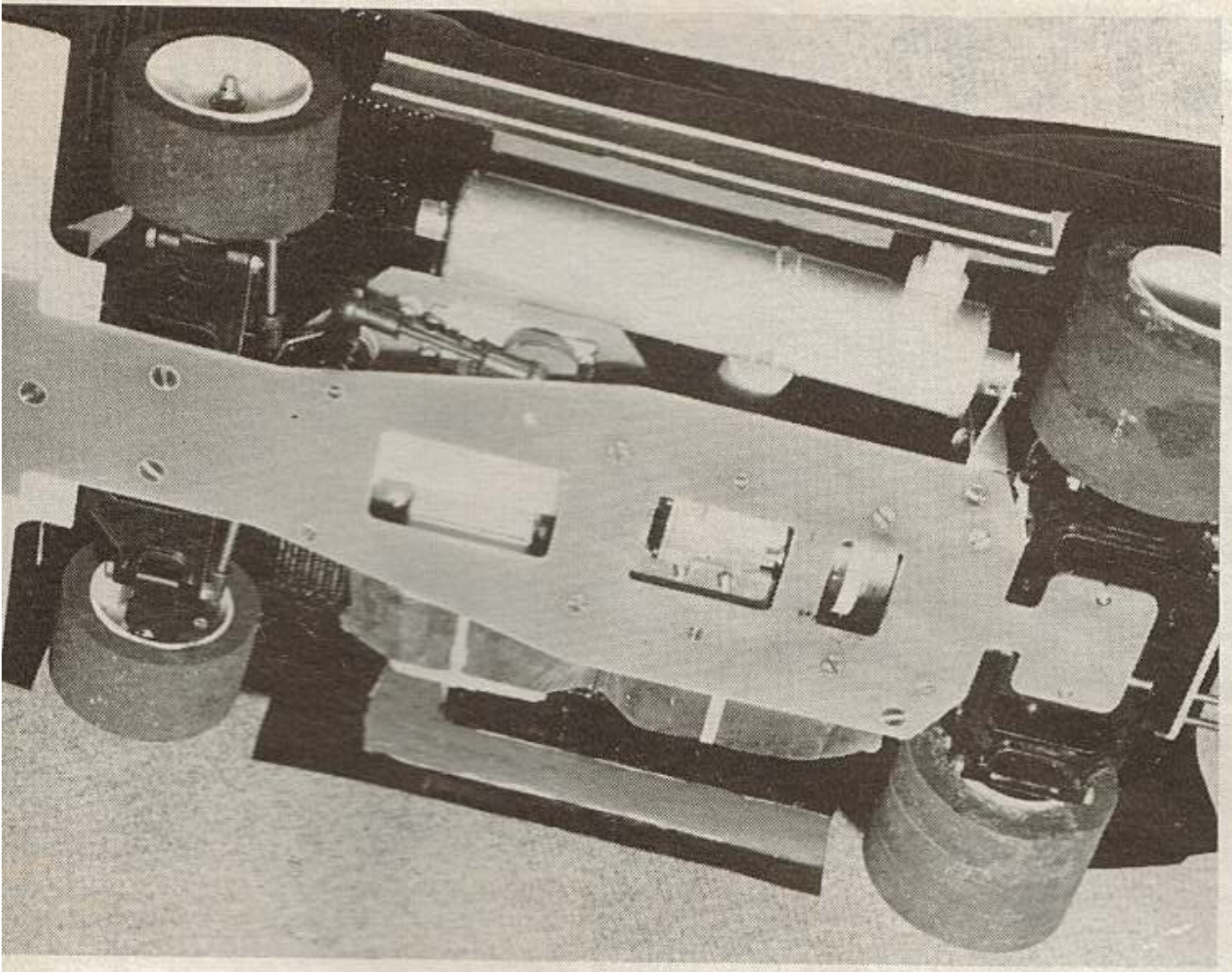
Ironically, this very involved moc reverses the usual throttle installati problem. Rotary barrel carburettors a very simple push-pull linkage installation whereas slide carbs need a bellcrank in t linkages. Not that installation is difficu pushrods are as near straight as possib and override positioning is obvious. Inci entally, the brake adjuster clearly shown two of the photographs is not included the kit, neither are the ball-races in t servo saver assembly.

The lightweight front mounted mini-pi silencer is, however, and the necessa silicone tube to complete it up to the engi manifold. Fitting this silencer is simple, is fitting of all the final bits and pieces su as rear and front bumpers, body po aerial, roll bar and wing tubes. Once t tyres are fitted to the rims following t instructions included, the car is ready have all the suspension adjustments mad

Setting-up

As well as toe-in, wing angle and t compound to sort out, the 'Rapier' dri has spring tension, ride height and dam ing to contend with. These adjustments c be made by trial and error, but a 'twe board' makes it all so much easier. My fi drive with the 'Rapier' certainly proved th for despite feeling that my sensitive thu has adjusted all the springs equally, the would not run straight under fie acceleration. After loosening off all t clamping nuts on the front wishbones, t springs can easily be evened up by care adjustment of the socket cap scr adjusters. As soon as I placed the 'Rapi on the tweak board and 'eyed it up' it w very apparent why the car would not r straight. Firstly, the springs were set far t hard, making the ride height too gre Secondly, the chassis had a pronounc 'lean.'

With springs set evenly and the dampi loosened right off, the handling began make more sense. It was obvious from t way the car dipped under acceleration a wallowed over bumps that it was unde damped. A little trial and error so resulted in the damping complete 'deadening' the car, so much so that wh dropped from a fair height, there was tendency at all for the car to bounce. S more improvement in handling result and by now it was becoming possible to fe for myself the advantages of the su pension. The car remains very predictab over bumps, making steering correctio less of a hit and miss affair, and the c seems glued down in the bends, as t chassis rolls, the tyres stay in full, flat co tact with the track surface. The kit tyr seem to provide good grip, and althoug had a supply of *Thorpe* wheels did not fe that, at this stage anyway, there was mu point in trying alternatives. As there virtually no bounce present, softer tyr can be used still further increasing t



Left: underside view of the chassis, all counter-bank screws. Above: Nationals winning duo of Gary Culver (left) Dave Martin (right) and Ian Agnew (centre) of AMPs.

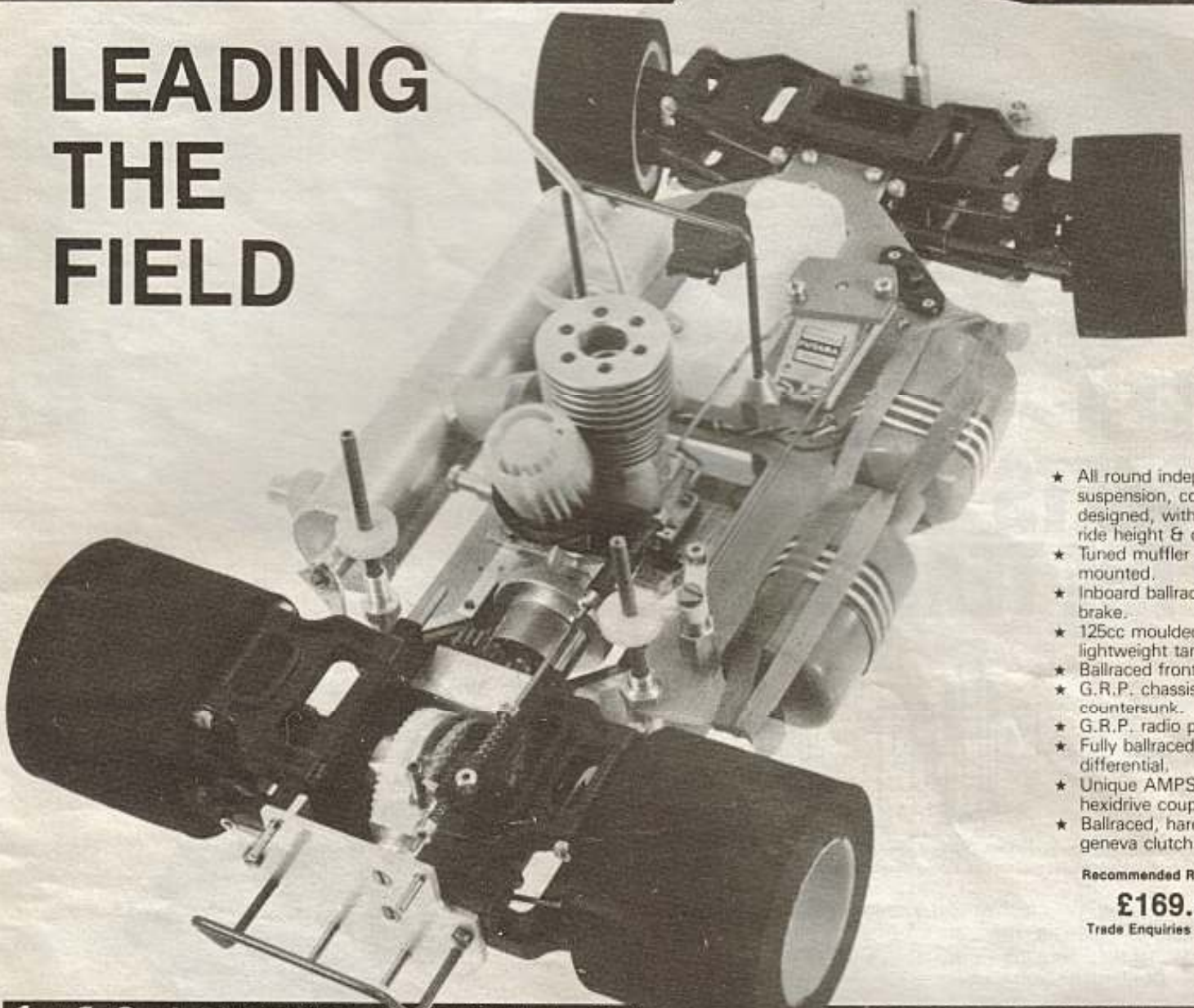
enefits of suspension.

With few minor criticisms, the 'Rapier' ands up well. It is the first of its kind and any will probably stand on the fence a hile and see how the opposition responds. AMPS are not going to be content to leave development alone however, and I feel sure that should any shortcomings become evident in the 'Rapier', Ian Miller and the works drivers will soon come up with a solution to enable them to retain the lead they have established.

Price £179.00. Distributed and manufactured by AMPS Ltd., Station House, Hertford, England.

AMPS RAPIER

LEADING THE FIELD



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