PROPOSALS FOR THE RESTORATION OF 1927/1929 ALVIS STRAIGHT EIGHT FRONT-WHEEL-DRIVE

1. THE EXISTING CAR

This car was acquired by Alan Stote and Tony Cox on 11 April 2006. The previous owner was G.N.S. (Nic) Davies, who had owned it since about 1955.

The known history of this car may be summarised as follows:

The engineless rolling chassis and body of a 1927 GP/200Mile Race car was purchased direct from Alvis by Bill Pitcher, a motorcycle dealer in Rugby, before the war. Tony Cox met Bill in 1975 when he was living in Chertsey. Bill told him that he had been a friend of one of the Roach Brothers, who ran a car breakers in Coventry. Roach had tipped him off about a batch of three special FWD cars that had been consigned to the breakers by Alvis, with strict instructions that they were to be broken up and not sold on.

At that time, the chassis still had its original disc wheels, and rear suspension, with plain tubular rear axle on trailing quarter elliptics, but no radiator or bonnet (which had presumably been removed to extract the engine). This car had been the No.2 Alvis entry for the 1927 GP, but both cars were withdrawn as they were unready for the race. It was, however, driven two weeks later by George Duller in the 1927 JCC 200 Mile Race, at Brooklands. The body has not been repainted and bears the racing number "2" to this day.

Pitcher then set about finding an engine. This came through Leslie Brookes, another Coventry friend. Brookes had seen a brand new 8 cylinder engine lying around the Alvis works; this had reputedly been borrowed by Ron Dalton of the Humber experimental department for some 6 months, and then returned. Apparently, Brookes was able to persuade the Works to part with the engine, and he passed it on to Pitcher, together with a complete transmission unit off another 8-cylinder car. This engine bears the number R85, which identifies it as being from a 1929 8-cylinder TT or Le Mans car. The transmission is also from a team car, either 1929 or 1930.

Bill Pitcher's venture came at a time when rear engine layouts were emerging as the shape of the future in motor racing. Bill Pitcher thought, not without some logic but certainly without a care for posterity, that he could make a very nice rear engined racing car out of his kit of parts. He got as far as throwing away the parts he didn't need - rear suspension, disc wheels, steering, radiator, bonnet, etc. - before giving up the project.

When Pitcher had to sell up his business, he sold the parts to Nic Davies, a life-long Alvis FWD enthusiast, who preserved it as an entity ever since. He travelled the world (Australia, Papua New Guinea, Florida, Wales) with the project following behind him in packing crates, sometimes lagging by a decade or two. However, to his eternal credit, he didn't lose anything and from about 1990 onwards he commenced assembly of the parts as one car.

On Saturday 19th April 2003, the engine was started for the first time in some 70 years and the car was run under its own power, round a field in Llanrhystyd, with

Nic Davies driving and Tony Cox assisting (Figure 1). It was in this state that the car recently changed hands.

Figure 1: First successful runs, April 2003, Nic Davies driving

2. ORIGINAL CONFIGURATION OF THE 1927 GP/200 MILE RACE CAR

The next three images (Figures 2-4) are period photos showing the original 1927 car, and its engine and transmission unit.

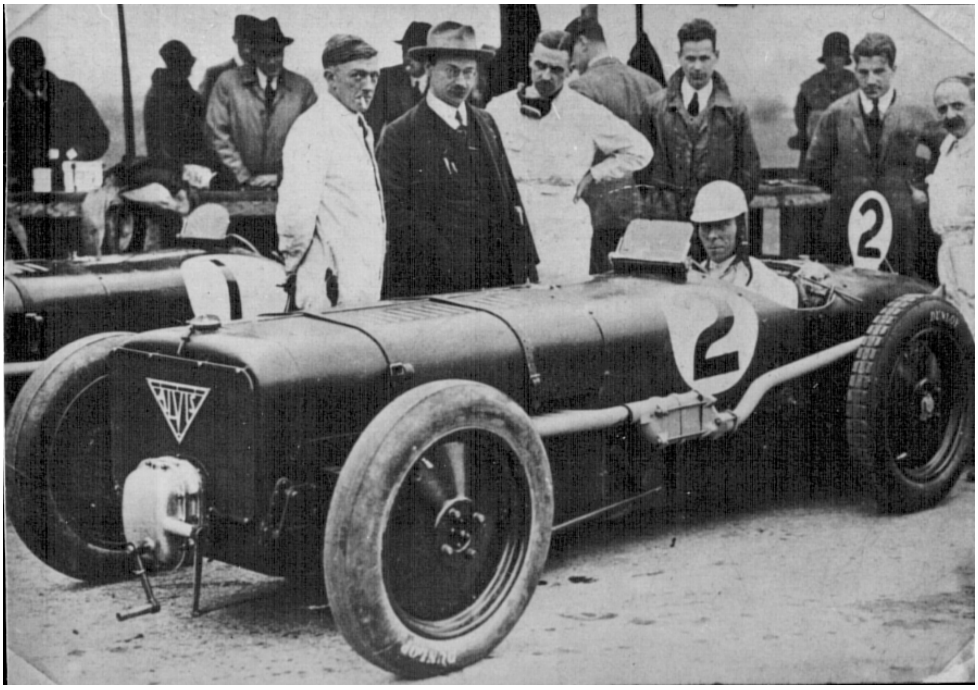

Figure 2: 1927 200 Mile Race, George Duller in car, apparently not enjoying it as much as Davies.

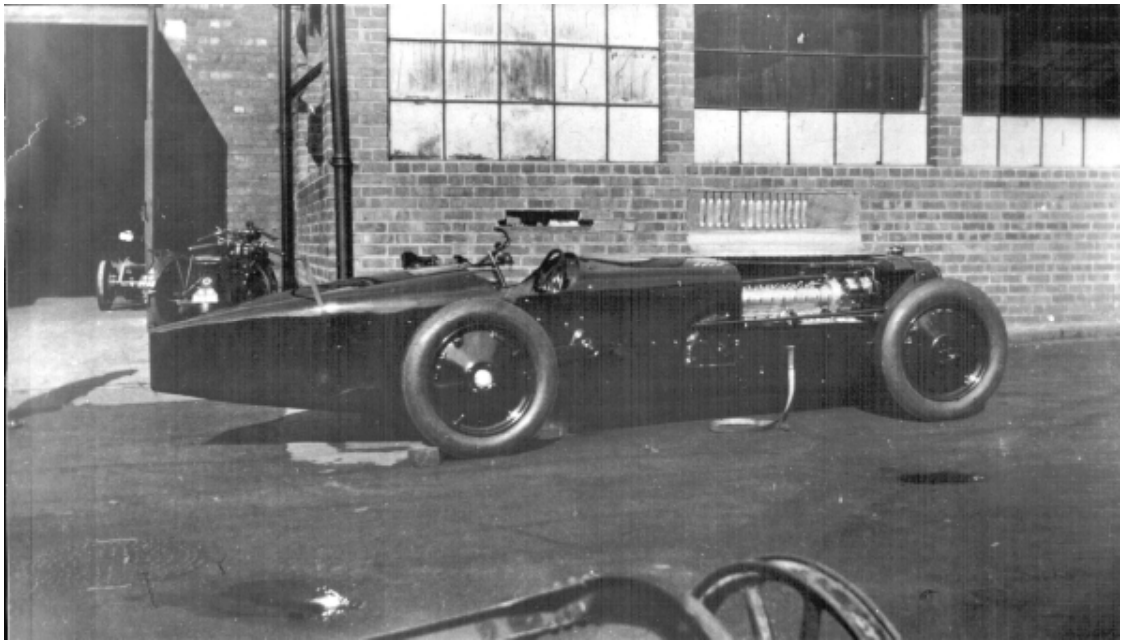

Figure 3: 1927 GP/200 Mile Race car, at Alvis Works. Note engine elevation relative to bulkhead.

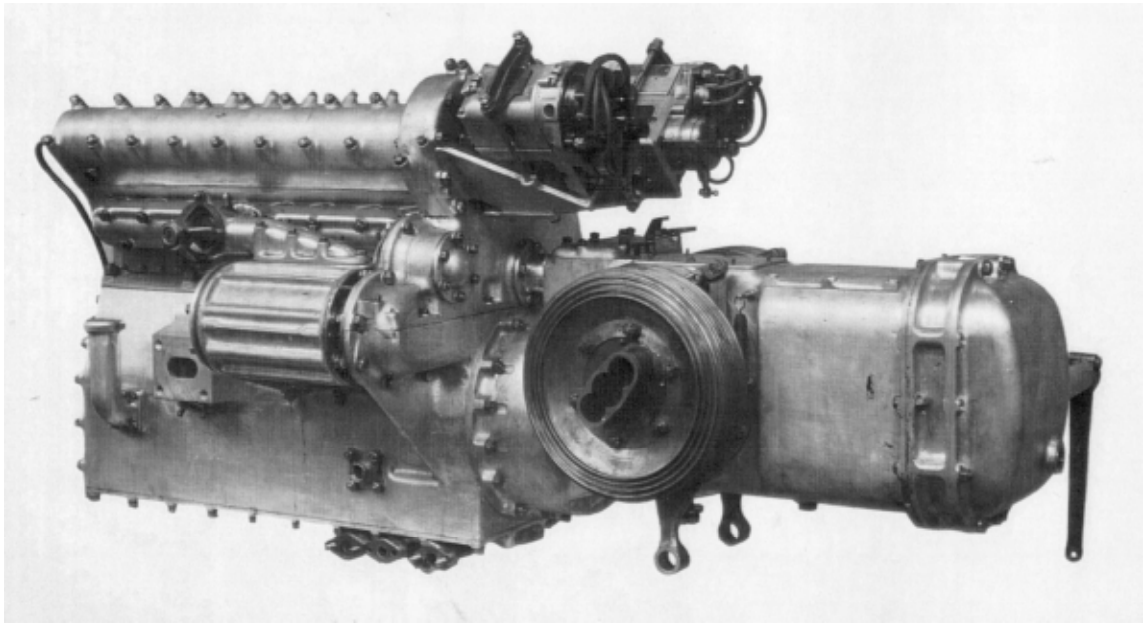

Figure 4: Works photo of 1927 engine and transmission assembly. Note relative elevations of bell housing and axis of inboard brake drums

What must be noted is that by comparing Figure 1 with Figure 3 the engine elevation is obviously far higher in the surviving car than it was in the original 1927 GP car. The reason for this is that the 1929 transmission unit has a different layout from that of the 1927 transmission illustrated in Figure 4. In the latter, the engine drive line passes under the axis of the differential and transverse output shafts, forward into the gearbox, up through the gears and back into the crown wheel/pinion/differential assembly. However, the 1929 layout had the engine drive line passing over the differential assembly and down through the gearbox (see Figure 7 below).

The resulting discrepancy in engine elevation has been estimated to be about 5.8 inches. In our view, this is unacceptable both in terms of historical accuracy and in terms of handling and safety.

There is no simple solution by mounting the gearbox upside-down, because that would reverse the rotation and the crown wheel cannot be swapped side-to-side. In any case, that would be an ugly compromise that was not in the minds of Alvis in either 1927 or 1929. They designed two different gear casings for just such reasons.

The other mis-match between the 1927 chassis and the 1929 engine is that the engine bearers were different on the two models. Figure 5 shows the way in which the 1927 chassis side rails have had to be cut to accommodate the 1929 engine bearers which are cast into the crankcase. (The 1927 engine bearers used detachable arms, as can be seen in Figure 4.)

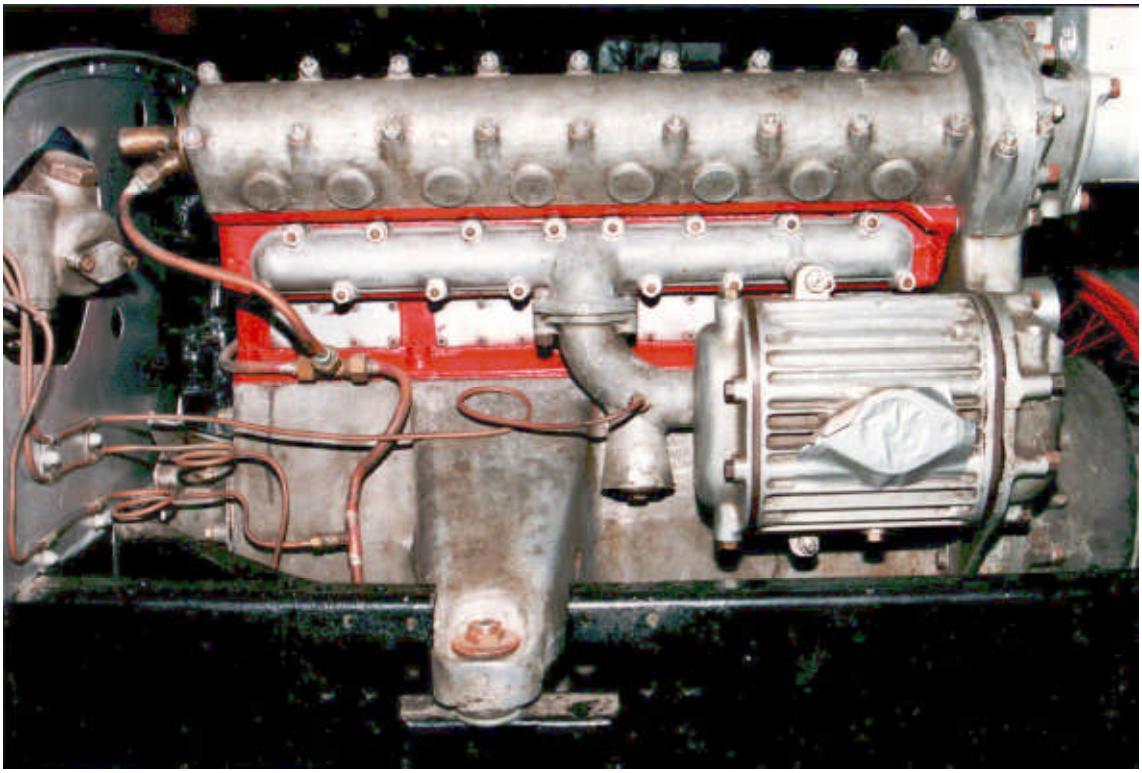

Figure 5: The surviving 1929 engine installed in the 1927 chassis

There is no satisfactory solution to this mis-match that does not involve damage to either the chassis or the crankcase.

There is a second, less serious, conflict at the rear of the engine, where the sportscar's Dynamotor mounting flange conflicts with a cross member, which has been cut back by an inch or so. This arises because the racing engine did not use a starter motor.

3. THE SURVIVING PARTS OF THE 1927 GP/200 MILE RACE CAR AND THE 1929/30 TT OR LE MANS CAR

The original parts surviving from the 1927 GP car are:

- Chassis frame
- Engine Bulkhead and Instrument Panel (without instruments)
- Body shell rear of the engine bulkhead
- Front axle complete: springs, drive shafts, outboard hub carriers, outboard universal joints, wheel hubs (Note: the outboard components probably came from the earlier 1926 and 1925 FWD cars, as they are identical in design. That means that these hubs are the very first FWD hubs on any British FWD car. They are not at present fitted, because wire wheels have been used, but they came with the car.)
- Steering drag links
- Bill Boddy has the original racing number plate from the tail of this car and has kindly agreed to restore it to its original location, when he has dug it out from what he calls his “muddle room”.

However, many key parts are missing, notably the 1927 engine, transmission, steering box and cross-shaft, disc wheels and the entire rear axle. The latter was similar to the surviving 1924 200 Mile Race Alvis now owned by Keith Taylor, but without the CWP, of course.

The surviving parts that are originally from a 1929-30 sports car are:

- Engine R85 (definitely 1929, not 100% sure which car but there is a link to VC766, which ran in the TT)
- Transmission unit (probably 1929 but could be 1930)
- Original dynamotor, which survived separately and was tracked down by Tony Cox in the 1970’s. He has been waiting a long time to have something to bolt it onto.

The 1929 engine is basically the same as the 1927, except that there is a different type of crankshaft and a different supercharger. The 1929 cars are well understood because there are surviving assembly drawings for the entire rolling chassis, the engine and the transmission unit (see Figure 6 and Figure 7). From Figure 6 it can be determined that, although the Straight Eight sports cars shared many common components with the standard 4-cylinder production models, they had a transverse spring rear suspension that is quite different.

Thus, among the parts that we have purchased, there is neither an original 1927 rear suspension, nor an original 1929 rear suspension. In order to get his car running, Nic Davies installed a rear suspension from a 4-cylinder car, turned from leading to trailing configuration. This suspension does not work well (far too little roll stiffness) and is not in the spirit of the original design of any Alvis car.

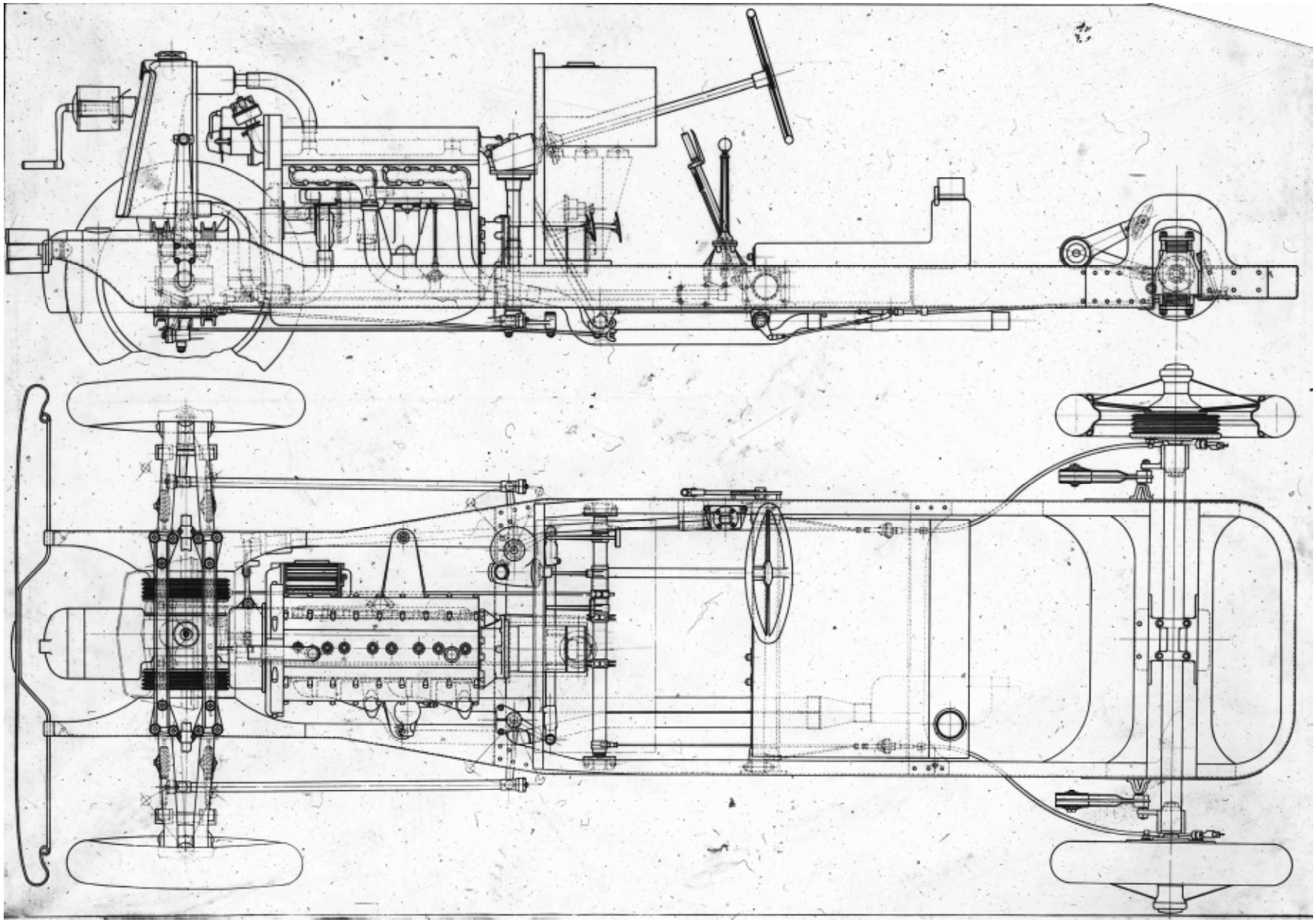

Figure 6: 1929 Chassis Assembly plan and elevation.

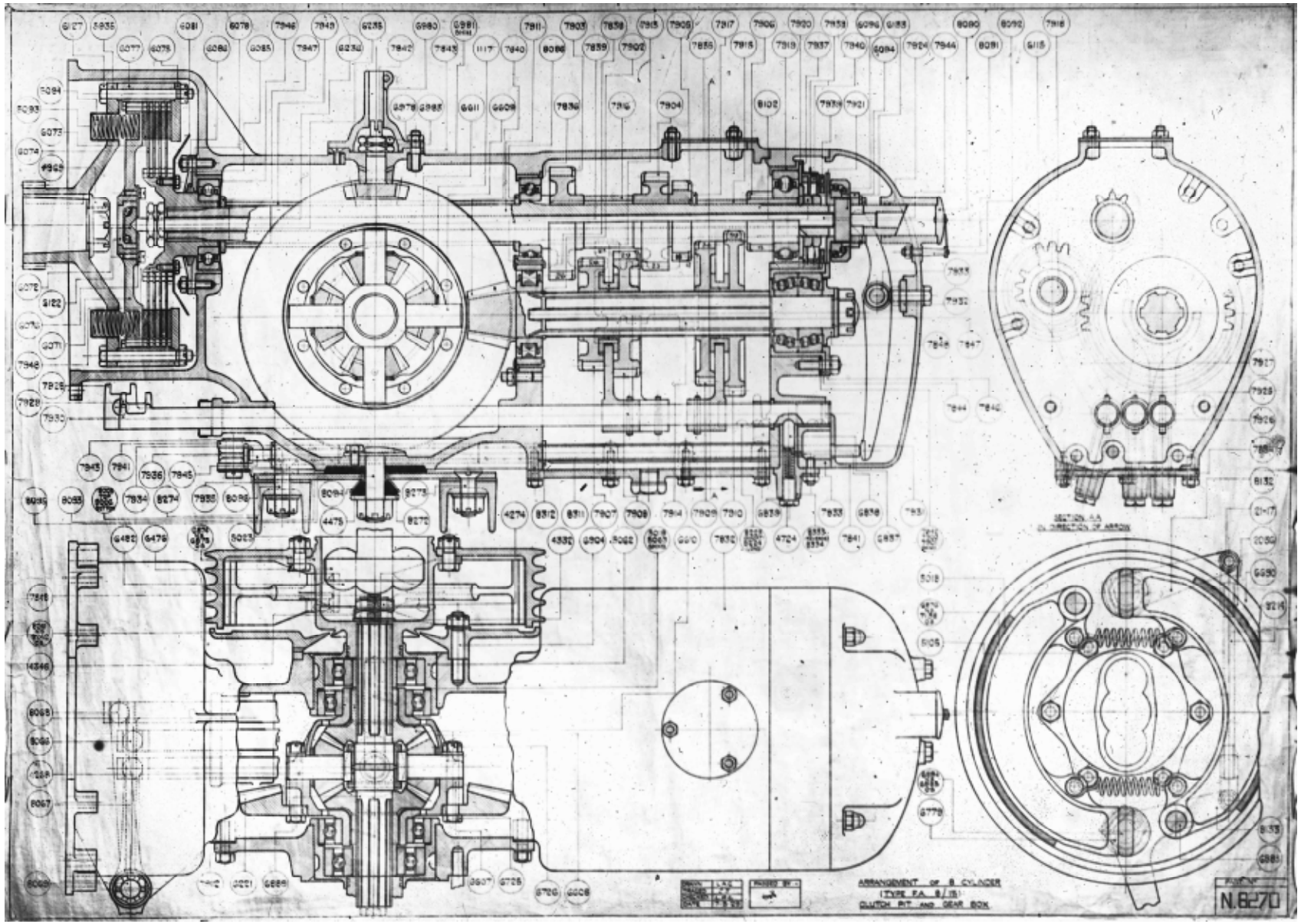

Figure 7: 1929-30 Eight Cylinder FWD Transmission Unit. Note engine drive line through multi-plate clutch to top left is above the axis of the transverse axle.

We therefore sum up the problems with our existing assembly of components in the following way:

- The gearbox is wrong for this chassis,
- The engine is wrong for this chassis,
- The rear suspension, although made from period components, is configured unlike any original Alvis.
- The engine and gearbox belong together and no proposed solution should result in their being separated.

4. OUR PROPOSALS

We approach our proposals by following a stepwise path that, if followed with the actual materials at our disposal, would not do any irreversible damage and would allow a change of direction at any time.

Our first conclusion is that:

The best way to get a historically correct Alvis Straight Eight running in a reasonable time would be to reconstruct a 1929 two-seater sportscar, using a replica chassis frame and other components from 4-cylinder FWD cars.

We propose to carry out this part of our plan first. The resulting car would be a replica of a Works two seater, as raced in the 1929 Double Twelve and the TT, as shown in Figure 8. The only other 1929 straight-eight body style was the four seater used at Le Mans, but these cars only appeared in that race and then disappeared—the two seaters had a longer history as team cars and in private ownership, and can be considered a better representative of the type.

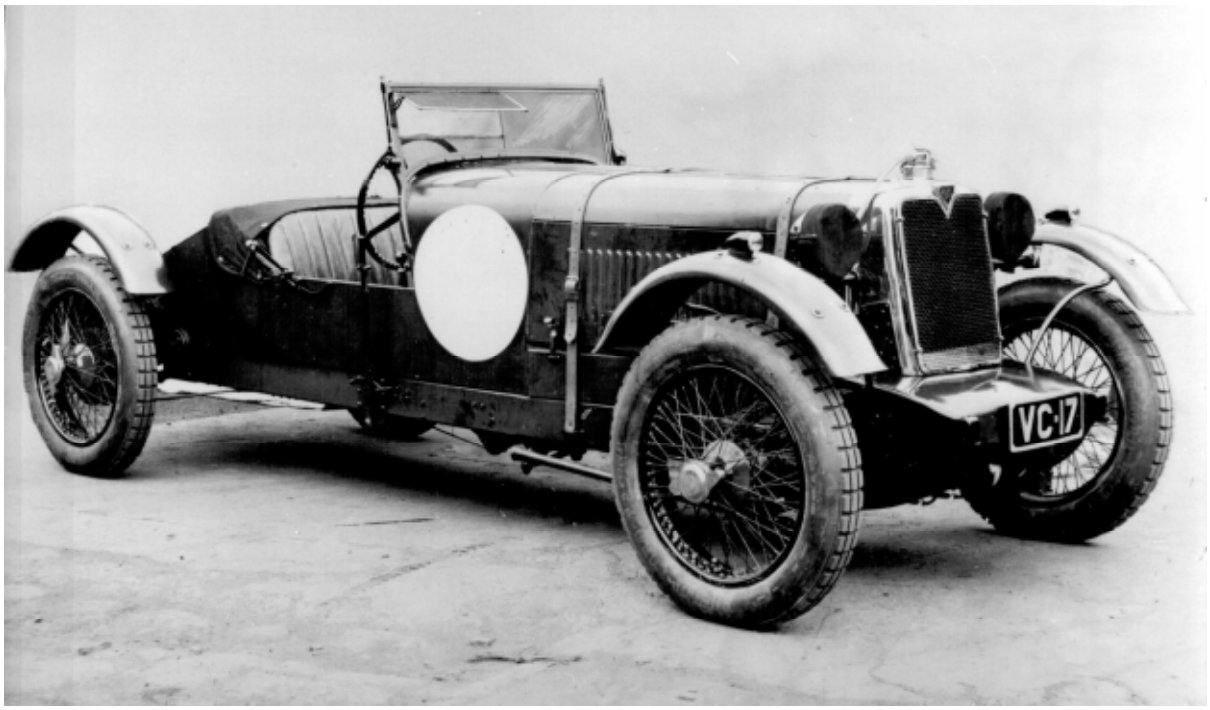

Figure 8: Period photo of 1929 TT two seater Straight Eight FWD

This solution would have the following advantages and disadvantages:

Advantages

Keeps the engine and transmission together

Results in a car with period engine, gearbox, front axle, and much of a rear axle (the hubs, brakes and stub axles would be from 4-cyl components, only the springs, spring mountings, and stub axle carriers would have to be replicated)

Can be rebuilt to virtually 100% accurate specification.

Gets a reasonably genuine Straight Eight FWD Alvis running and visible within the shortest period of time. (None of these cars have been seen for some 60 years, so it is about time.)

Disadvantages

Would have a replica chassis frame and some replica components in the rear suspension.

Leaves behind a rather deflated pile of important original GP single seater parts, wondering where they go from here.

Our second conclusion is that:

The 1927 GP parts are important and must not be allowed to languish.

The surviving chassis has been cut about but has not been severely damaged. Our first action would be to repair the damage and restore the frame to its exact 1927 specification.

We would then refit the original front hubs and their related disc wheels (Michelin patent wheels made under licence by Dunlop). This would not involve any replication if we can find original wheels of the correct dimensions, but it may be necessary to make new wheels.

We would then replicate the original rear suspension using contemporary photographs together with measurements from the surviving 1924 rear-drive 200 Mile Race Car.

We would restore the surviving body shell, so far as possible avoiding the destruction of its original markings. (This is a major problem because the paint is in very poor condition and is not even the same colour as original, due to fading. Advice on this, on policy or technique, would be appreciated.)

That would yield a rolling chassis and a spectacular-looking single seater car that has quite a lot of provenance and is of considerable historical interest. The problem would be—no power.

Of the choices that then have to be made, the simplest is the gearbox. The only “off-the-shelf” option would be a 4-cylinder FWD gearbox of the period, but this does not have an overslung gearbox (i.e., the gearbox is between clutch and diff) and therefore sets the engine back a long way. If a 4-cylinder FWD engine were used to drive it, the whole assembly would be about 5 inches longer than the equivalent 8-cyl assembly (measured from the differential axis to the rear of the engine).

We are forced to the conclusion that an overslung gearbox is the only option, and that means making one. If we are going to that much trouble, we might as well make it to 1927 pattern rather than 1929, and that is what we propose. This is being done by measuring all the internal components of our 1929 gearbox and redrawing those parts in the 1927 layout, with a casing designed by reference to the excellent original photos of the exterior of the 1927 unit and our own measurements of the interior of the 1929 casing.

The final piece of the jig-saw is the engine. With the overslung gearbox, we could accommodate a 4-cyl FWD engine, so far as length is concerned. There would be some difficult compromises in mating the 4-cylinder engine with its standard clutch housing to a small diameter multi-plate clutch on the transmission—one or other would have to give way. The 4 cylinder engine is taller than the eight but there is quite a lot of headroom in the original engine bay (see Figure 3) so we think it would fit. However, there is the not inconsiderable problem that the engine rotation would be wrong. If that could be solved, this solution would meet the rule of thumb "3 out of 5", because it would have period chassis, engine and front axle, and (we think, importantly) most of its original body.

But, it would be a "special" and for that reason this is not the solution we prefer. We consider that, objectively, a 1927 GP car with a replica of its original engine is a far more interesting thing than the same car with a standard production 4-cyl engine.

Thus our final conclusion is that:

The ultimate status of the surviving GP parts should be within a car that, albeit composed of significant numbers of replica parts, is a faithful reconstruction of a 1927 GP/200 Mile Race Alvis.

We are therefore embarking on the replication of a complete straight eight engine, to suit the 1927 GP chassis and the replica gearbox. This engine will be basically identical to our TT engine, but there will be some changes for compatibility with the GP chassis and for historical accuracy.

For example, we will need to run with the original dry sump lubrication, as the deep wet sump on the TT engine might cause ground clearance problems and is historically incorrect. The engine bearers were different on the two crankcases and on the GP there was no mounting flange for the Dynastart.

The GP supercharger was a vane-type, drawing through an updraft Solex carburettor, unlike the Roots-type blower with horizontal Solex on the TT car. With the engine at its correct elevation, the horizontal Solex may clash with the narrow GP chassis frame. The choice of supercharger is not yet decided.

In summary, our plans will result in the restoration of a 1929 eight cylinder FWD sportscar almost all from period components, and the recreation of a 1927 single seater racing car, which will incorporating the first British implementation of FWD and will otherwise comprise replica parts that are close to original specification.

In modern vintage racing, the GP car should be reasonably competitive without any use of modern technology—it was claimed to have been capable of 125 mph.

5. THE PARTNERS IN OWNERSHIP

The owners bring together complementary capabilities but a completely shared vision of this project.

Alan Stote is a successful businessman who has built up an outstanding collection of Alvis cars over the past 20 years. He is a devotee of all things Alvis and besides superbly maintained examples of 4.3 Litre and Speed 25 models, he also owns the Powys-Lybbe 12/50, the Goodwin Special, and an outstanding 4-cylinder FWD tourer. He is the proprietor of Red Triangle Ltd which took over the spares and service functions of Alvis Ltd after car production ceased in 1967.

Dr Tony Cox is the FWD Registrar of the Alvis Register and in that capacity looks after the individual histories and provenance of all surviving Alvis FWD cars. He has owned FWD cars since the early 1970's and one of these was the first FWD Alvis to win a race for 53 years, at Donington in 1986, in the hands of Gerry Michelmore. Tony is a Fellow of the Institution of Mechanical Engineers and a practising consulting engineer. He operates the FWD web site www.hells-confetti.com through which owners in the UK, Australia, Japan and continental Europe keep in contact.

Questions or comments about this project are very welcome and may be addressed to the owners at the following addresses:

Alan Stote
Yarhampton House
Dunley
Stourport-on-Severn, Worcs. DY13 0XA
Tel: +44 (0)1299 896418
Mob: +44 (0)781 840 6475
Email: alanstote@yarhampton.fsnet.co.uk

Tony Cox
20 Pollard Road
Morden, Surrey SM4 6EG
Tel: +44 (0)20 8648 5012
Mob: +44 (0)790 355 9648
Email: tony.cox@hells-confetti.com