Traction Transplants

Gearbox problems.

The major cause of really serious mechanical problems in the Citroen Traction Avant is the loss of a tooth or teeth from the crown-wheel-and-pinion (CWP) in the transmission final drive. Experience and common opinion seem to support this proposition. The CWP and the low gear constant mesh pinion have long been the transmission's major weak points and appear to result from design (and material?) faults in the original production.

Other Traction weak points such as the drive shafts do not normally cause the instantaneous and traumatic immobilisation which a bad CWP failure is well and truly capable of producing.

While there are examples of CWPs having travelled many tens of thousands of miles without or before failure, none-the-less, every few months or so, we hear the tragic story of a club member whose car has become immobilised because of CWP failure.

Were the problem to be just the loss of the CWP itself, it would be bad enough. However, the situation can be one of either a "clean break" or a "dirty break", as David Gries so eloquently puts it.

In the clean break situation, the piece(s) of broken gear tooth fall into the bottom of the transmission case, and the prudent driver, hearing something amiss, stops his vehicle and doesn't proceed. He "only" has to find a replacement CWP and rebuild it into the transmission.

In the more tragic and not uncommon dirty break situation, the broken tooth after falling to the bottom of the box, is picked up and jams between the crown-wheel and pinion gears themselves. This may occur immediately on breakage of the tooth, or commonly, if the imprudent or unwary driver ignores the characteristic clicking due to the missing tooth and "pushes on", the broken piece subsequently picks between the moving gear faces.

The result is usually very sad. The momentum of the car, conveyed from the road-wheels through the transmission, causes the still-rotating crown-wheel and pinion to be strongly wedged apart by the presence of the "foreign object" jammed between them. The usual result is that sufficient lateral force is generated to actually split the gearbox housing (and bell housing?), and incidently to deposit the transmission oi lon the roadway beneath. It is possible that other gears in the transmission will be damaged also by the shock loadings. All in all, not a pretty sight! Now the Tractionist must find not only another CWP but also another gearbox casing and possibly other bits as well. Even spare casings are now difficult to come by.

Admittedly, opinions vary a bit, and almost certainly, having a properly adjusted CWP is a better bet than plugging fervently onwards with a pig-in-a-poke type of setup of uncertain background.

However, any CWP you come across now (except the few newly-made ones) will be many years old, probably have done a lot of work, and probably have fatigue and worn case-hardening added to any "built-in" shortcomings. While insentitive clutch operation and violent acceleration on hard surfaces may increase the risk of CWP failures, there are stories of that ominous "snap" sound occuring when gently backing out from the curb, especially when the car is cold.

Thus, I believe it is no exaggeration to consider any Traction gearbox still fitted with an original-type CWP as a potential time-bomb, just waiting to cause serious and expensive damage to your Tractioning pleasure.

What can be done about it?

The ideal would be to rebuild the Traction gearbox, using a newly-manufactured modern CWP. That way, you'd gain reliability and retain originality which many are keen to do. Of course, you should make any other improvements and repairs to the box at the same time (second gear bushes, bearings, seals etc). However, unless you bought a set when they were still available ($300/set!), you'll find that all the original run of new CWPs made in Europe a few years ago have now gone. Plans to make further sets of CWPs in the UK (or even here in Australia) seem to be in abeyance at present, the main obstacle in all cases being to get enough orders in advance to provide for a long enough production run and hence to get an acceptably low unit cost. Incidently, if you'd bought your spare CWPs in 1960, they'd have cost you all of 19 pounds sterling each!

The other way is to install an alternative gearbox and put your Traction box aside so it doesn't destroy itself in use and so it can rebuilt later when new CWPs become available. It could be argued that by doing this, you are actually retaining the ability to readily restore your car to full originality at some later date.

Which alternative?

One could replace the gearbox only, adapting it to fit onto the Traction motor, or what would be easier in all probability, find an existing motor/transmission of similar configuration to that of the Traction, and "slip it in" as a unit. For example, the Renault 16, 18, 20 etc power-units are aligned "north-south", have the gearbox to the front, with front-wheel-drive offtake coming out between the box and motor. Alternatively, one might consider "transmission only" adaptions, taken for example from VW Beetle, Renault, Subaru, Skoda and so on. All these would require a reasonable amount of modification to make them "fit" at the mounting points, clutch housing and driveshaft coupling points. No doubt, such problems are not insurmountable however, and there is one local example where a VW gearbox has been used as above but with a "foreign" motor as well.

However the most common and earliest adaption is based on the power unit which followed the Traction - that of the 1911 cc Citroen ID. A 1911 cc Citroen DS unit can also be used if an ID gearbox lid is available to be fitted to it.

Apart from having a cross-flow head (carburettor on left side of motor) and four forward gears instead of three, the ID power unit is and looks very similar to that of the Traction, in fact many components are interchangeable. Hence, the ID unit doesn't look "out of place" under the Traction bonnet. If you are keen enough, you can "Tractionise" the ID unit by fitting the non-crossflow head and manifolds. Even the Traction-style two-rod gearshift has been very effectively adapted to fit the ID gearbox in one instance.

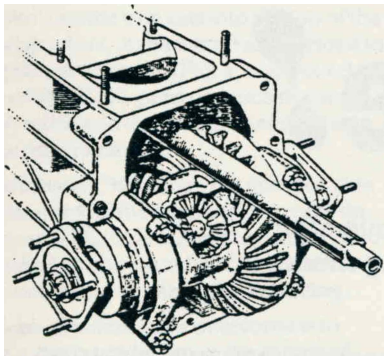
With such modifications, the ID power unit can be made so that only the relative expert would pick it as non-original. And you've eliminated many worries and gained some positive benefits - no gearbox worries, more power, shell bearings on the crankshaft, four speeds with a higher and easier cruising top gear etc.

Careful planning and fitting keeps modifications to the Traction engine bay (and cockpit) down to to an absolute minimum - usually the odd small hole which can be plugged up later if desired - so that refitting the Traction unit later is not a problem in terms of structure or appearance. No wonder it is such a popular conversion.

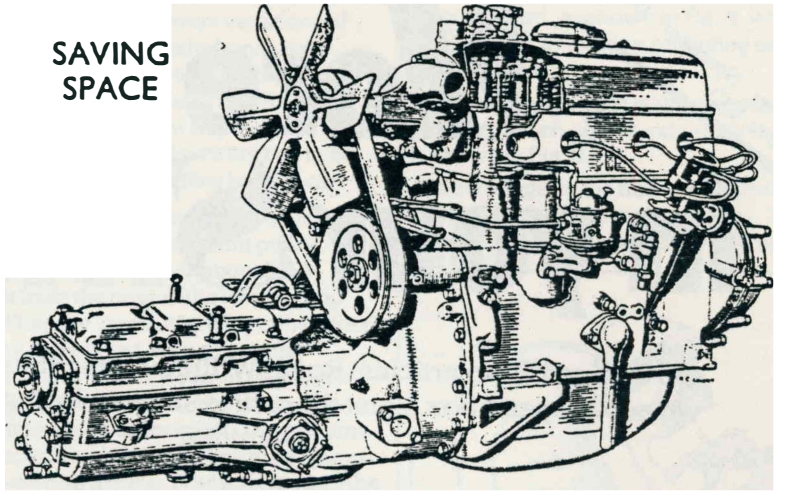
Any Tractionist is well advised to collect an ID power unit (or gearbox at least) and put it aside for this purpose. Don't leave your move too late though - even ID units are becoming scarce.

Incidently, it is claimed that the first "ID conversion" may have been performed in Australia or New Zealand - more research and story to follow?

SAVING SPACE



The crown-wheel, bevel pinion and differential are compact and in unit with the gearbox, the bevel pinion being integral with the gearbox lay-shaft. Short transmission shafts run at right angles to the front wheels.



The three-gear gearbox on the Citroen is mounted ahead of the front wheel centre as clearly shown in this drawing, the drive being taken over the crown wheel and pinion by an extension shaft shown below, left. The above drawing also indicates the principal features of the 1,911 c.c. engine which produces 56 b.h.p. Of particular interest is the way in which wet cylinder liners are inserted into the water space of the main crankcase cylinder casting.

Footnote: Lest the above discussion appear to be a misleading indictment that Traction CWPs "have only themselves to blame" for their demise, it should not be overlooked that gearboxes using these components were employed very successfully in competition situations. However, this usually required strengthening and stiffening of the box to ensure that the CWP remained in proper mesh under load. In fact, the major obvious improvement apparent in the D box in this regard is not in the CWP design but in box strength and rigidity of location of components.

Hence in rebuilding a Traction gearbox, it is highly adviseable to closely examine it and consider making some of the after-market or competition improvements to enhance component lifespan, especially of the CWP.

We start the following series of overseas and local notes on Traction Transplants with the first of the excellent presentations by Roger Williams in the November 1986 issue of Floating Power (Traction Owners Club UK).

Bill Graham/Jack Weaver.