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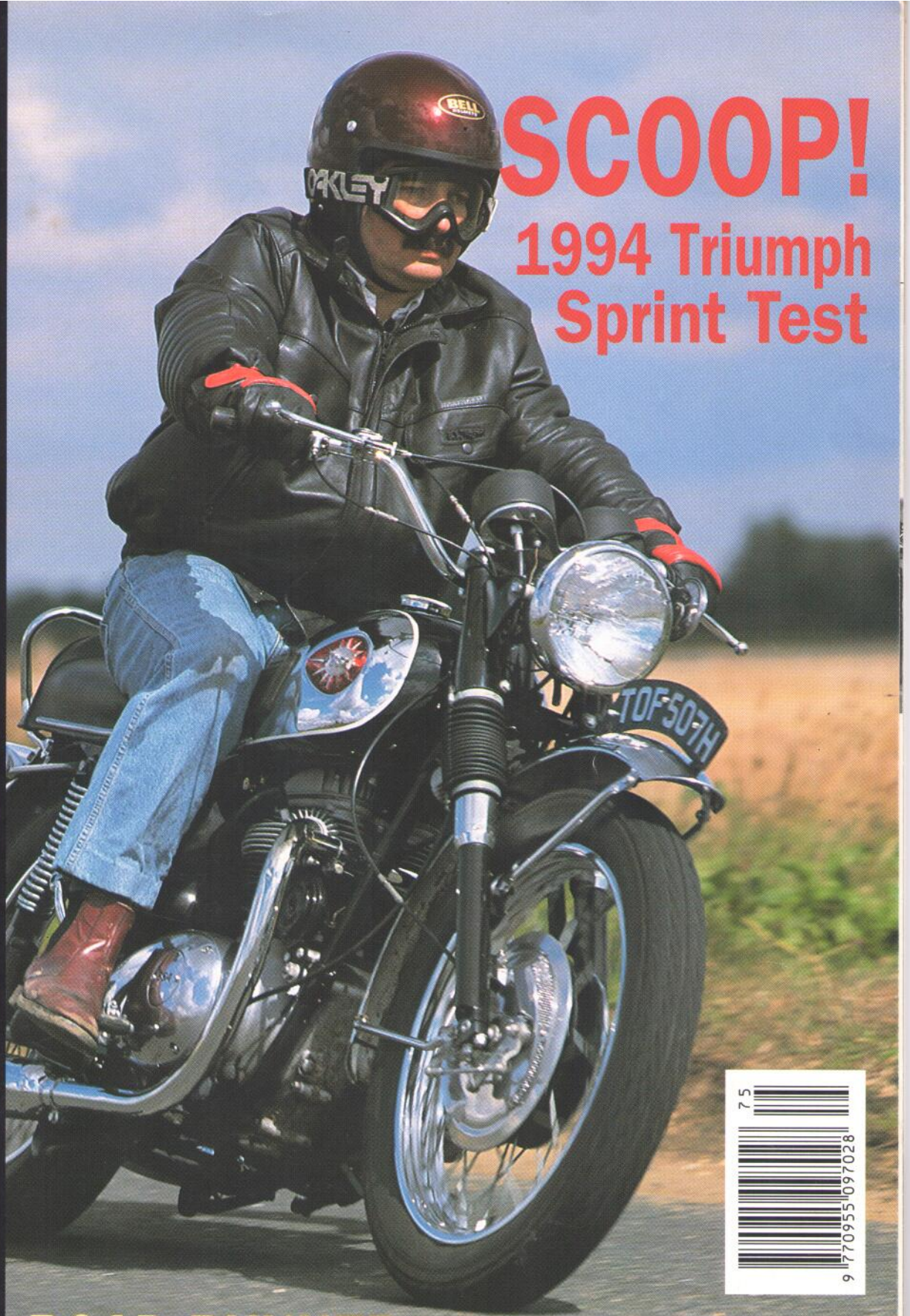

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SENSITIVELY LUBRICATED

*The Triumph Bonneville T140 is known to have certain lubrication problems, internal, external and breathing. **Steve Parlour** applies the eye of reason to the model, explodes a few myths and suggests some solutions*

During the life of the unit Triumph twins, many assumptions have been made about their shortcomings and how to overcome them. Various aftermarket products have been produced, sworn by and sworn at. Opinions given on modifications are often conflicting, but always given with an air of authority.

The lubrication system of the oil-in-frame models from 1971 onwards is a popular area of discussion. Let us examine this, not from an expert's polarised view, but from the practical and necessarily simplistic position of the owner.

COOLING

When Dr Porsche designed the Volkswagen engine, although primarily air-cooled, the oil played a significant part in cooling as well as lubrication. The majority of motorcycle engines do not use oil for engine cooling and Edward Turner's Triumph twins are no exception. It should therefore be noted that an oil cooler when fitted will cool the oil, not the engine. Mistaken assumptions to the contrary have been made by many, myself included. Over the years they become statements of fact which receive no further analysis — which we shall now do.

In the T140/TR7, 372cc of a petrol/air mix is compressed and ignited every revolution in an alloy head. This gets hot, very hot, and a trickle of oil through the rocker shafts and dribbling down the pushrod tubes makes little difference to this problem. Changing the temperature of that oil by inclusion of an oil cooler makes a slight difference to an insignificant one. The top end gets hot and, particularly on the single carb TR7, the carburettors get hot. The overheating symptoms remain.

One of the most frustrating problems of overheating is the dragging clutch, as when overheating occurs you are more likely to be in heavy traffic, stationary, unable to find neutral and the tendons in your left hand are about to snap. The chaincase, of course, receives no circulated oil, only a hot pressurised mist en route to atmosphere, so an oil cooler will give no improvement here either. I hate to say this, but those with covers polished to a mirror finish probably have fewer problems in this area than the rest of us.

I fitted a Norman Hyde oil cooler and thermostat to my TR7 in the mistaken belief that this would cure the overheating problems I had been encountering in the Croydon rush hour one particularly hot summer. The overheating continued and the thermostat didn't even open. Upon telephoning Norman Hyde, it was explained to me that I should give the bike a good thrashing, leave it on tickover in the garage and the 'stat would open. I put a thermometer in the return line and sure enough the 'stat opened exactly when specified. The engine was cooking by this point.

The assumption made by many that engine overheating and oil temperature are related is all part of the oil cooler mythology. They must be addressed separately. Whilst overheating is experienced in the mercifully few hot days we get in this country under conditions already mentioned, oil overheating is a very different matter. In traffic, engine revs are low, oil circulates more slowly and remains in the tank longer, so is relatively cool when the engine is hot.

Under motorway conditions and similar, however, when eighty miles may be covered within the hour, conditions are reversed. The engine benefits from the substantial airflow and retains a good running temperature, but the oil is under maximum stress, circulated much faster, under full load and given little time to cool and recover in the tank before being pressed into service again. Draining the oil at a motorway service station will verify how thin and watery it can become. Don't do this unless it can be collected and ecologically disposed of under supervision of an adult.

It's in circumstances like these that the oil cooler is needed. I certainly wouldn't be without mine, although I now run without the thermostat to simplify plumbing and simply take extra care in warming up.

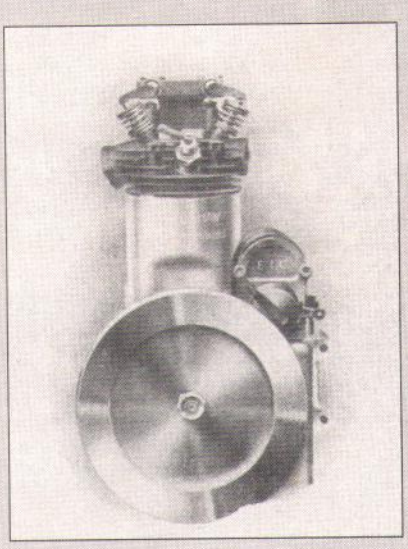
The replacement main bearings in my engine have so far lasted twice as long as the originals, which I feel must be partly due to using the cooler and filter, although the quality of bearings fitted by Meriden may have some significance.

OIL-COOLED ENGINES

Dr Ferdinand Porsche may have used the oil to help cool the flat four engine he designed for the Volkwagen Beetle, but he was not the first to do this. In the early 1920's, proprietary engine manufacturer Bradshaw designed and marketed a peculiar looking power unit which also used the oil as a cooling medium, in this instance by extending the wet-sump crankcase to enclose a cast iron-barrel which finished in a finned cylinder head. This engine was most famously used in the Dot-Bradshaw, but other small motorcycle assemblers using it included New Scale, OK, Sparkbrook and Sirrah.

In May 1922 *The Motor Cycle* published an article debating the merits of oil cooling, which was basically a description of the Bradshaw and its workings. Apart from a high capacity oil pump and the extended crankcase, it was entirely conventional.

Motorcyclists did not take to the concept in any great numbers, and the idea of oil cooling was allowed to drop until revived by - wait for it - Suzuki in the 1980s. The lubrication system of the high performance GSXR750 motor sprayed oil on to the underside of the pistons in an attempt to dissipate heat. This idea seems to have worked, and the model sold well, probably because it looked entirely conventional externally and was marketed skilfully.



FILTERING

Amongst the popular myths surrounding the T140, the filtering has its fair share of adherents. One point agreed on by all is the inadequacy of the "tea strainer" fitted as standard to the base of the tank tube. This is easily confirmed by fitting a paper type oil filter system as provided by Charlie's of Bristol and examining the crud collected upstream of the filter that was not evident whilst using the strainer.

Many experts and non-experts have said "Never put a filter in the supply line" or "Never put a filter on the suction side". Let us examine these points in detail.

There are various reasons given for these statements. One is the fail-safe argument which has some slim merit, as it would be better for a completely clogged filter to cause wet sumping rather than loss of supply. We are blessed, however, on these "modern" machines with an oil pressure switch, and such filter neglect deserves little sympathy. The ability of the filter to restrict flow in two different circumstances is not that straightforward anyway.

The other reason is due to a common layman's assumption that a pump cannot suck as well as it can blow, or even that the oil presents itself at the pump by the grace of gravity. This is not true. Assuming no fluid or air leaks, the suction flow must be the same as delivery flow, and given the same circumstances, the pressure on delivery will equal the negative pressure on suction. It can therefore pull through a filter just as readily as push.

To avoid further technical argument

A great rider's machine, the T140's lubrication system can be simply modified to make it more efficient

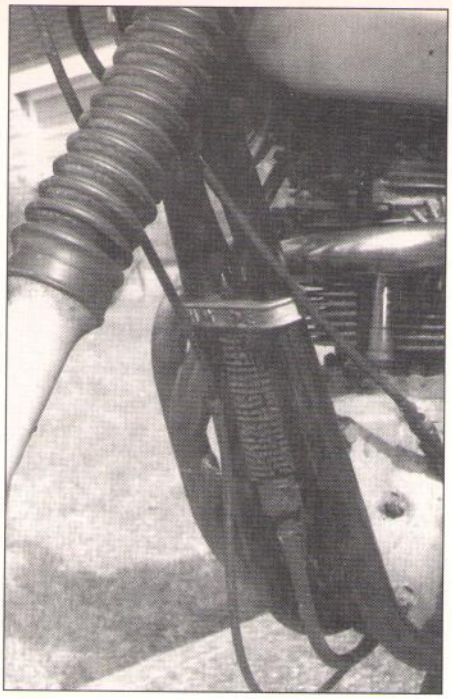
we can accept that neither the delivery side of the feed or the suction side of the return are available for consideration due to their plumbing being entirely internal.

The two alternatives remaining have the following to take into consideration.

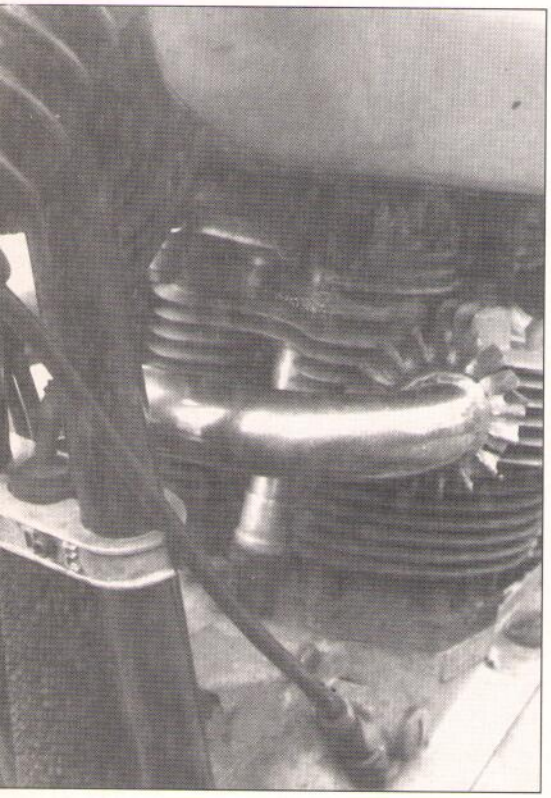
The filter in the feed at the base of the tank (as in the Charlie's arrangement) is as close as possible to the crank, where we would like the cleanest oil to be. The tubular oil tank used ensures that oil has had the maximum time to settle so that there is little aeration involved which would be bad for pressure maintenance.

There is also some assistance lent in the form of the pressurisation of the tank by pumped crankcase gases, only partially relieved by the tank breather. For purists, there is no external evidence of adaptation.

The return line cannot develop the same pressure as the feed as it is so full of air, and therefore compressible. We all know what that does to brake fluid! A clogged filter will therefore restrict flow that much sooner. As a return line filter is so far upstream of the pump and crank, there is a greater risk of contamination, including accidental debris through the



The Hyde oil cooler won't help much in slow traffic but has a beneficial effect at high speed over long distances



Alloy pushrod tubes available from Richard Hacker Motorcycles help cure oil leaks from this area

filler. Care must also be taken to ensure that sludge which will collect upstream of any filter will not settle back to the pump on standstill and is easily removed when the filter is changed. The presence of a return line filter is usually obvious to those that care about such things.

All these things considered, preference would probably be given to the feed line filter, but there are variables as I'm sure many are eager to point out. Filter density, total filter element surface area and frequency of oil and filter change will all affect the above to some degree. There are many points to take into consideration before accepting established myth.

You may feel the failsafe reasons override the rest, but you must remember disaster would only occur with complete obstruction of the filter and simultaneous failure of the pressure switch. Countering this, a pump failure is less likely with a filter immediately upstream.

Whatever you do, don't think that fitting a filter allows the removal of a strainer elsewhere — they are essential to the protection of the pump.

KEEPING IT IN

There are people who claim to have oil-tight 750 Triumphs which always appear clean and dry whenever you see them. The real test though is the long distance, high speed run which can make the parking space of a previously admired bike look as if a Filipino-crewed tanker has recently passed by. Sadly, these units do not seem to breathe as well as their ancestors with timed breathers.

There is one part of this engine which leaks and yet has nothing to do with breathing. It is also easily cured.

The standard chromed pushrod tubes have a top ring which presses an O-ring into a recess in the underside of the head. This is tack-welded to the tube, and works fine to begin with, but with age it begins to sag (as we all do) between the welds, thus no longer presenting a flat surface to the O-ring. Replace these with the alloy items available from Richard Hacker's of Penge to name one supplier. These tubes are turned to the correct shape to match the originals and, being solid do not sag and give uneven pressure to the O-ring. It's as simple as that. Alloy tubes may not look the same as chrome, but then they don't rust either. I know — yours aren't rusty, but they would be if they didn't leak.

It's the breathing, or lack of it, that's generally accepted as being the cause of leaks in an engine which has been worked hard. No matter how good the faces are, if it builds up enough pressure, it will come out somewhere.

Before the Mk2 Amal, the breather from the oil tank joined the chaincase to atmosphere tube by means of a tee-piece concealed by the air filter box. This assumes that you haven't already got rid of the standard airbox, which is another, quite separate consideration. Being unable to resist experimenting, I have found that if these breathers are taken to atmosphere separately, there is a reduction in oil seepage from the chaincase, for example, the alternator cable exit and the gearshift shaft. Clearly, continuous pressure from the tank at the tee-piece hampers the passage of crankcase gases to atmosphere and creates a build-up in the chaincase.

The arrival of Mk2 Amals and more stringent emission control regulations changed this arrangement. Breathing the oil tank straight into the exhaust rocker

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LUBRICANTS

The recommended oil for the T140 is 20/50 multigrade. Many national and regional oil companies can supply this, including:

BP, BP House, Victoria St, London SW1E 5NJ (071 821 2733)

Castrol, Burmah House, Pipers Way, Swindon, Wilts SN3 1RE (0793 30151)

Century, PO Box 2, Century St, Hanley, Staffs ST1 5HU (0782 29521)

Comma, Denton Industrial Area, Gravesend, Kent DA12 2QX (0474 64311)

Morris & Co, Castle Foregate, Shrewsbury SY1 2EL (0743 5243)

Rock Oil, PO Box 155, Wharf Street, Warrington, Cheshire (0925 36191)

Shell, Cobden House, Station Road, Cheadle Hulme, Cheshire SK8 5AD (061 488 3000)

Silkolene, Belper, Derbys DE5 1WF (077382 4151)

Penrite Oil, Unit 1B, 31 Dollman St, Birmingham B7 4RP (021 333 5383) have a number of "heavy" multigrades which may be suitable.

In hot weather, monograde 40 or 50 may be used to top up.

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box simplified the breather tubes but, we must assume, put greater stress on the rocker box, which now had to hold leakage through valve guides and oil tank pressure until the crankcase allowed it to pass through the tappet block drain holes. The main crankcase breather now went to the airbox in order to meet regulations which decree that an engine should be forced to inhale its own waste gases. Those who think of engines in human terms had best not dwell on that concept.

My own machine is adapted to take the tank breather into the rocker box, a simple drill and tap job. The rubber piping chosen is only a sliding fit over the new rocker box stub, the assumption being that this will blow off before the rocker box gasket fails.

The main breather pipe from the chaincase remains but without the first short length and tee piece. This discharges in the conventional position at the number plate, albeit a little shorter now.

Direct venting of the crankcase is a popular modification although many of those who should know tell us that some crankcase pressure is essential. One method of direct venting is to drill and tap the back of the timing chest in order to attach a further breather tube. Another, I have seen just once, is to change the timing plug in the crankcase with a sleeve nut; the one that carries the alternator cable over the primary chain is allegedly suitable. You then attach a tube to that. The main disadvantage here is that the gas vented is too heavily oil laden to discharge to atmosphere, unless you want to make following road users mucky at your own expense. To get round this problem, you need to vent this into the oil tank.

The oil tank has its own problems, so if you use this as a catchment, you must still provide a vent for the tank which must be capable of dealing with the total. You're going to have to drill and tap the tank.

You're also going to have to be very serious, possibly racing, before contemplating such drastic action, but if racing, then a catchment tank would be preferred. I'm afraid the line must be drawn somewhere.

CONCLUSION

We in the world of British motorcycles are fairly unusual in these selfish times in having a healthy respect for the opinions of senior members of our fraternity.

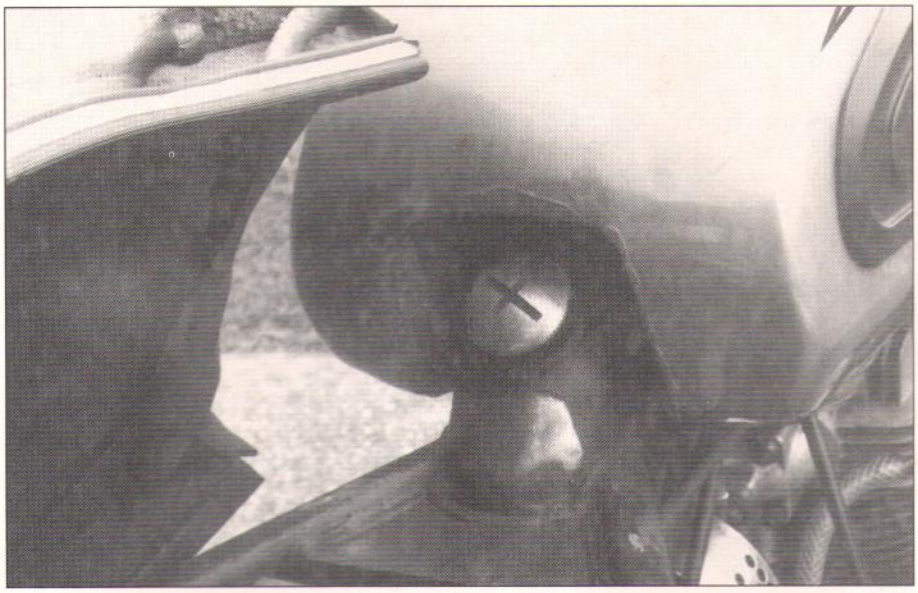
We do accept quite readily the advice given in the pub car park by those old enough to know what they're talking about. After all, many British motorcycle designs are evolutionary, outliving changes of company or being carried in the heads of designers as they swap places.

It's not easy therefore to dismiss these views, as a young man might ignore an old man's view of the latest Japanese rocket. We should accept, however, that they might be wrong. Even "experts" can have widely varying opinions on the same subject, and don't forget that most experts are probably trying to sell you something.

If we combine the above with a need to exercise individual thought, a belief that the original design can be improved on and a willingness to fix that which isn't broken then we have the makings of controversy in the clubhouse and individuality breaking out all over. The world is all the richer for it.

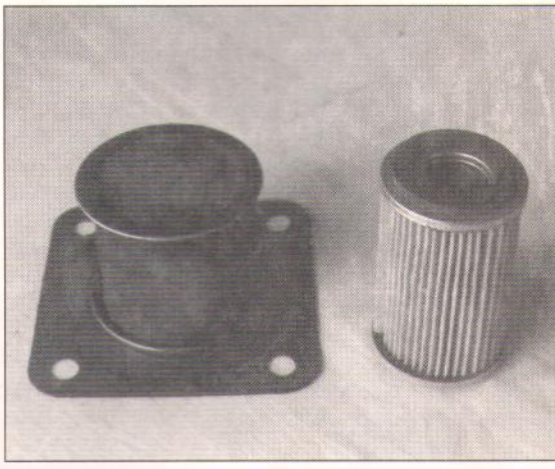
OIL PUMPS

There are several alternatives to the standard T140 pump, including the later four-valve unit developed by Triumph and available from Triumph spares stockists. Autovalues Engineering (Albion Road, Idle, Bradford, West Yorks BD10 9RL; tel: 0274 614424) make two types of pump under the Morgo brand for this model. One is a "conventional" but higher capacity plunger unit and the other is a rotary design which circulates the lubricant at a greater rate and higher pressure.



OIL FILTERS & COOLERS

A number of firms supply oil filters for the T140, including:
Charlies Motorcycles, 169 Fishponds Road, Eastville, Bristol BS5 6PR (0275 511019)
JH Motorcycles, 86 Leavesden Road, North Watford, Herts WD2 5EH (0923 242908)
Kirby Rowbotham, 58 Arch Street, Rugeley, Staffs WS15 1DL (0889 584758)
Shadowfax Engineering, Billing Station House, Cogenhoe, Northants NN7 1NQ (0604 890995)
Norman Hyde, Rigby Close, Heathcote, Warwick CV34 6TL (0926 497375) markets a cooler kit with optional thermostat.



ABOVE LEFT: The T140's oil filler, inconvenient to use and the cause of marginal oil capacity. The prototype frame had the cap at the steering head end, but a problem with frothing led to resiting at the next available point

ABOVE: The original oil strainer compared with one of Charlie's paper filters