OVER THE YEARS, since its birth, the post war Vincent motorcycle has been more extensively modified than any other make of machine that readily springs to mind. Bearing in mind the recent references in MPH to the lack of interest being shown in the new members of the Club, it is felt that the time is possibly ripe for an appraisal of some of the many modifications that have appeared on the Vincent over the years. Hence this article which is intended to be (time allowing) the first in a series.

Perhaps before we delve into the intricacies of the Vincent, we should enlarge on what we hope to attain in compiling this up to date list of mods. It is hoped to discuss the merits and disadvantages of each modification, and to gain the maximum advantage from such discussion, it is hoped that club members will not be slow in coming forward with their views. It is hoped that even the most experienced owners will possibly learn of the odd new mod, and when reading of some of the more obvious ones, which will be included for the newer members' benefit, they will not assume that they are being taught how to suck eggs. We will start with the engine and then eventually get around to the cycle parts.

BREATHERS

This is a good controversial subject on which to start a stimulating discussion. During the middle 'fifties, very few Vincents were seen that did not have at least one extra breather, and in many cases as many as half a dozen were quite common. Were they all necessary, in fact were any of them necessary?

To evaluate this question we must first of all take a look at the standard breathers, and we will deal with the engine first. On the "B" and most of the "C" models, except for a few just prior to the introduction of the "D", the only engine breather was a mechanically timed version. On the twin this was open for approximately 140 degrees of crankshaft rotation, and closed at about 30 degrees after bottom dead centre on the rear cylinder. On the singles, the time open was approximately the same, but it opened 35-41 degrees after top dead centre and closed at somewhere around 2 degrees before bottom dead centre. In both cases the operation is basically the same, with a slot in a sleeve attached to a pinion periodically lining up with a slot in a hollow spindle, and the excess of pressure escaping via the hollow spindle and a suitable exterior pipe.

Theoretically the breather will be correctly timed when the letter B on the breather pinion is meshed with the B on the front camshaft pinion on the twin, or the B on the larger idler in the case of the single. This assumes that the breather pinion spindles are fixed into the crankcase in the correct position. As a rough guide, on the twin the slot should point towards the top magneto stud, and on the single the slot should face straight down.

Possible Faults

It has been suggested that the duration and possibly timing of the mechanical breather was worked out incorrectly when the machine was originally designed, but the fact remains that a Vincent engine fitted only with a standard breather can with careful assembly be made completely oiltight; the one basic requirement being that the engine is in good mechanical condition. Therefore it would appear that any modifications to the existing breather or addition of extra breathers would be unnecessary, but funnily enough this is not necessarily true.

When used for racing and/or high speed touring the efficiency of the standard breather can be improved, but usually slightly increases oil loss via the breather. This is done by filing straight across the breather sleeve slot until it is approximately 3/8 in. wide, and then rounding the outer ends of the resulting flat. Note that the edges of the slot in the spindle should be left as standard. This increased size of outlet can be further assisted by fitting a straight through union on the exterior of the crankcase in place of the existing banjo and leading a large bore pipe upwards and over the engine to the rear of the machine. Of course in the case of the single with the outlet at the rear of the cylinder the run of the pipe will be led rearwards in the most convenient manner, but it is a good idea to lead it upwards as it helps to drain any oil entering the pipe back into the engine.

Usually any deficiencies in the standard breathing are caused by incorrect assembly or a well worn engine, and this is when the additional breathers start to sprout from the engine. The usual reasons given for fitting these extra breathers is either to cure an oil leak or to stop condensation, or of course both. To expect any better performance from modifications to breathers is being extremely hopeful, and certainly to prove any such increase one would need a brake to carry out accurate tests.

Atmospheric breather
Before listing the various places that breathers can be fitted, it would be as well to mention the other standard breather fitted to the late "C" and all "D" models. In this case the mechanical breather was substituted by an atmospheric one situated on the front cylinder inlet valve cap. The idea of positioning it here apparently being that there would be less oil in the immediate vicinity of the outlet and so less should be lost via the breather. In many rider's experience this breather on its own is not sufficient to get rid of internal crankcase pressure. The result is that oil tends to get forced through into the primary chaincase and to leak out of every available place.

The cure seems to be to fit a further atmospheric breather onto one of the caps on the rear cylinder-head. The only trouble is deciding which one to use, for the rear exhaust valve cap, which being the highest point of the rear cylinder head is the logical place on which to fit the extra breather, is shrouded by the upper frame member, and so consequently there is not room to use standard breather components. Some people have drilled and tapped the side of a standard cap, fitted it with a straight through union, placed this over the rear exhaust valve, and led the breather pipe rearwards from it. This is apparently quite satisfactory.

Breathers have at various times been fitted to all accessible caps on the cylinder heads of "B", "C" and "D" machines, and owners have claimed various advantages. One point to watch is that when the union is fitted to the caps over any of the valve tappet adjusters, oil tends to get thrown off of the rockers straight into the breather pipe, and consequent oil loss is high. The most common non standard set up is to have the mechanical breather and an atmospheric one over the front inlet or exhaust valve cap. This appears to be a very satisfactory arrangement, but it is debatable whether both are really necessary.

Atmospheric breathers are often fitted to the magneto or distributor drive cover; these are usually fitted to stop oil being forced through the magneto or to stop condensation in the timing cover. The first is more easily cured by fitting a new seal to the mag., and the second can be overcome by changing the oil regularly. Often when the mechanical valve lifter is replaced by decompressors in the cylinder heads, the hole in the timing chest is fitted with a union and used as a breather, again there appears to be no valid reason.

**Chaincase condensation**

The other most common place for additional breathers on the engine is the primary chaincase cover. The usual reason for this is to get rid of condensation and consequent sludging. The usual places are the oil filler cum chain inspection cap, the hole used for mounting the left hand kickstarter or the oil level hole. The necessity for a breather in any of these places has mainly disappeared owing to modern oils, and if condensation and sludging still persists, Filtrate market a fluid which will disperse it completely.

There have over the years been one or two unusual breather arrangements; one notable one being that on the George Russell Concours Rapide. He led the mechanical breather from the front of the crankcase into the top of the primary chaincase via a suitable union, and then to atmosphere via a specially constructed plug inserted into the left hand kickstarter hole. While this would probably balance the pressure in the chaincase and crankcase and so reduce loss of oil into the chaincase, it is felt that exhausting engine fumes into the chaincase would have an adverse effect on chain life.

Before finishing with the breathers that can have been fitted to the engine it must be mentioned that when a Vincent engine is revved to limits far above those to which it was intended to go then non standard breathers can improve breathing. Therefore when racing, an engine usually will benefit from an increase in the size of all the breathers. One of the most common examples of this, is the 1 in. plus diameter of the atmospheric breathers fitted to the timing case of Jim Smith prepared motors.

**Gearbox breathing**

The gearbox breathes through the oil filler, via flats machined on the top diameter of the dipstick and approximately 1/16 in. diameter holes in the oil filler cap. Although modifications have been made to the filler cap and large bore pipes have been seen leading from them, it cannot be seen that any real advantage can be gained. The standard arrangement seems to be 100% efficient providing that the gearbox is not overfilled, and no oil seems to find its way to the outside of the machine via the holes in the filler cap.

Although not probably intended, the gearbox also tends to breathe via the ball bearing of the ratchet shaft behind the kickstarter cover. Again providing the gearbox is not over filled, the oil loss is slight. In fact it will be found that if this bearing is packed with HMP grease on assembly there is usually no loss at all. In fact it will usually be found that any oil which leaks out of the kickstarter cover will have come from the primary chaincase, either by way of the tunnel intended for the left hand kickstarter shaft, or along the holes through which pass the crankcase studs which have their heads inside of the primary chaincase.
Oil and petrol tank

The petrol tank breathes via a small hole in the cap, this hole should be kept clear at all times or petrol starvation will result. When racing or during prolonged high speed riding such as on the motorway it is a good thing to open up this hole a little, but don't over do it or petrol will leak onto the top of the tank.

The early series "B" oil tank had a breather pipe fitted, which led from just below the filler orifice to the rear of the tank, and then via a 5/16 in. pipe to the rear chain. There was no control over the amount of oil which found its way on to the rear chain and tyre. This was subsequently modified, and altered to a controlled chain oiler with a small tapered screw controlling the amount of oil let onto the chain. The old type breather is best blanked off, as both type of oil tank also breathe via a small hole in the filler cap. The series "D" also breathes via the small hole in the filler cap.

One useful modification, in the case of the "D" tank, is to mount a small baffle in the neck of the filler orifice above the oil return. If this is not done oil tends to get thrown upwards and out of the breather hole. It is quite easy to shape a piece of tin, and by placing a hole in it to fit over the chain oiler screw, it can easily be retained in the neck of the filler hole.

Next we hope to discuss the timing chest and the many modifications that can be done to its contents. We will, I hope, be able to go into more detail than has been the case in this introductory article.