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= SUBJECTS =

TUNING ON B.S.A. GOLD STAR MODELS

The subject of special tuning on BSA Gold Star engines is a recurring question posed by enthusiasts desiring additional performance and one that has little in way of answer. It might be better summarised by stating that there is no "magic" way to increase the power output of the Clubman Gold Star engine. There are no Works-produced components, no "secret" cams, etc. All of the components considered standard on the Clubman engine are already maximum; the Clubman cam pattern is the maximum for general racing, the Grand Prix carburetor is the largest now available for maximum filling and the exhaust system is matched to the cam.

The Clubman Gold Star engine is just about a maximum development in a push-rod engine type, running nearly 1.7 Hp. per cubic inch of piston displacement on gasoline and will render a most excellent account of itself in almost any form of competition providing it is properly tuned in accordance with the standards outlined in the Gold Star Manual. The Clubman engine is nearly 10 Hp. more than was anticipated and perhaps 5 Hp. better than even the most optimistic engineering projection for a push-rod engine running on gasoline.

It is entirely true that small additional power gains can be accomplished by skilled tuners, not a great deal since the engine is already so near to maximum, but nevertheless a power increase. Broadly speaking this might approximate 2 Hp. seldom more and even 2 Hp. would be considered an excellent mechanical achievement not too often realised. However, it is emphasized that this is not from the installation of any single component but rather from a combination of things such as insuring that all dimensions are completely finished to exact and precise standards without even the normal limits of manufacturing plus-minus tolerances, that infinite care has been rendered exact timing, jetting and gearing; On a lesser engine a few simple components can render an immediate power gain. On a maximum engine such as the Clubman the improvement can only be measured by hours of work and infinite attention to detail.

It is also true that some skilled craftsmen have achieved beneficial results by changes in the cam patterns on an individual basis, usually in combination with a tuned intake-exhaust system. There is no set formula for such cam diagrams and hence no information is available as to the timing. The ultimate cam pattern rests within the ability of the tuner and, further, within the limits of what he is prepared to sacrifice for additional power (i.e. flexibility, limited power range, acceleration, etc.). For example, a more radical timing could perhaps be beneficial for an all-out straightaway speed attempt with an unlimited entry to the trap. Or, to put it another way, trading speed for acceleration. Obviously then, for a drag event where acceleration is paramount, such radical timing would defeat the purpose. Conversely, neither straightaway cam patterns or drag event cam timing would be maximum for the speedway where the engine must deliver adequate power over a broad range, say from 4000 RPM through 7000 RPM.

The main point of emphasis is that there is no such thing as a "maximum" engine for all purposes. It can be maximum for one function or other ...drags,speedway or straightaway .... it cannot be maximum for all.

Hence, in summary, it can be said that there is no easy path to additional power from the Clubman Gold Star engine. If the engine is properly tuned,dimensioned and timed it is fairly close to the maximum in standard form as received. It is obvious, of course, that bad tuning can defeat any design and any combination of components. It is emphasized that there is no such thing as a "good" or "bad" engine; there is only quality workmanship or inferior assembly and the end result will be immediately apparent. Engine power is not a product of accident or luck; any given set of components will produce a given power result with the only variances being the care given the dimensional aspect. To say this another way - any two engines of like components assembled with zero tolerances will give a like power result. If they vary it will only be because somewhere the dimensions are not in conformity... a bearing tighter, timing fractionally off, etc. Therefore it follows that the more expert craftsman-tuner with experience and patience can show power results better than a similar engine in lesser hands. It is not the engine that is better - it is the mechanic. And the sum total of these power results are not confined to the engine alone. The finished workman can start with exactly the same power but end up with better performance by his knowledge of finite gearing, tire adhesion, slippage ratios, etc. and by taking into consideration how his rider uses his power, how much weight he is pulling and what line he takes through the corner.

The differences between the make-up of the Catalina Scrambler Gold Star and the Clubman Gold Star engines are not always too well understood. The Catalina engine is a scrambles engines built for maximum torque, not maximum power. The Clubman engine is a racing engine built for maximum power in a narrower range. Power output differential between the two is about 8 Hp. difference in favor of the Clubman engine. However, the maximum useful power in the Catalina engine commences well down in the revolution range; in the Clubman engine the useful power commences at about 4000 RPM and runs up to about 7000 RPM and, in compensation for the lesser power at low RPM, the maximum power at top RPM is considerably more. Thus this an exemplification of compromise - the eternal law of engineering.

The Catalina engine may be converted to the maximum power Clubman engine by installing the Clubman cylinder head, Grand Prix racing carburetor, Clubman cam and exhaust tube. Thus this is the initial step in Gold Star tuning if the model is a Catalina. If it is already set up to Clubman standards there is little to be gained by radical changes unless it is a specific gain for some specific use at the sacrifice of some other quality and here it is repeated that there are no magic components with which to achieve this end... only the finite mechanical knowledge of advanced engine practise. For the serious practitioner in engine lore this must start at the very beginning of engine theory, something that is completely outside the scope of this brochure. There are many excellent books on engine theory; this composite knowledge must be gained by the mechanic before any results on an engine as highly refined as the Clubman Gold Star could be expected. This is obvious inasmuch as the components are already maximum fitments and thus the gains will consist of hours and hours of skilled work picking up a few revs here and there from dimensional control, finite timing, etc. which in the composite may result in 100 RPM or more and thus a winning engine.

This brochure refers only to gasoline-fueled engines. It does not take into account any experimentation with blended fuels, additives, aromatics, nitros,etc. which are in an entirely different sphere. The subject of fuel engines is covered in a separate bulletin.