SINGLES SPOT

A DUCATI 250 FOR RACING CONT.

will occur with such violence that the rider will be thrown off. The only damper capable of correcting this condition is the hydraulic type which is velocity-sensitive. Hydraulic dampers have no effect on small, low-speed steering oscillations, but they will prevent the forks from flapping. Before we try any serious racing, the friction damper will be removed, and a hydraulic damper substituted.

A lot of people have tried to make touring brakes do a racing job, and to best of our knowledge, this has never been entirely successful. So, just to nip-off a budding problem, we ordered a set of Oldani brake from Italy. These have 200 millimeter (7.88-inch) drums, cast of magnesium alloy with rivited-in iron liners. The front brake has double-leading shoe actuation; the rear, single. A flange is provided for mounting the rear wheel sprocket but it is rigid, instead of the drive, a spring-hub Oldani sprocket is supposed to be used with the Oldani rear hub. We have another idea for the sprocket arrangement which will be explained next month. Cushion-hub Oldani sprockets are rare, and we are trying to use as many readily-available parts as possible,

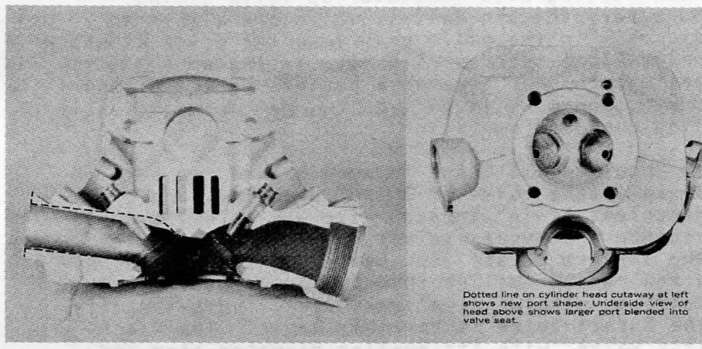
Clip-on bars, complete with control levers, can be obtained from Berliner Corporation, the Ducati distributors, and we elected to use these. They are made to fit the bike and you won't find anything better. Fuel tank and fairing both came from Custom Plastics. The use of Good-Year road racing tires should not need explanation. Proper racing tires are absolutely essential, and our experience with the Good-Years indicated that they are at least as good in terms of adhesion as anything available. They are also somewhat expensive, but the wear-rate is so low that when one considers frequence of replacement, the Good Year tires are a racing bargain.

This brings us to the end of the chassis modifications: At least, until testing indicates that other changes will be needed.

A 250 DUCATI FOR RACING PART TWO

We have remarked upon the Ducati 250's racing potential; previously (before this Ducati racing project), we have not explained why the potential is there. Taken on its design features, the Ducati engine impresses one as being just the thing for racing. The radically "over-square" bore/stroke ration (1 277:1) would seem to insure large valve sizes and low piston speeds at high revs; the valves are operated from an overhead camshaft; and all of the engine castings are of aluminum alloy. Just as important as these theoretical considerations is the fact that in service the Ducati 250 has proven to be nearly unbreakable.

Unfortunately, for what we had in mind the standard of reliability established by normal (or even slightly abnormal) service was of limited value. It is axiomatic that maximum power will ultimately come from maximum revs, and our first task was to determine what order of crank speeds the Ducati was likely to withstand. Piston speed is one index of this; a better one is piston acceleration. This is calculated from stroke, connecting rod length, and engine speed. There is no fixed limit for piston acceleration, but considering that the Ducati has a good, forged piston, we tentatively placed our target limit at 125,000 ft/sec./2 That limit is reached at just under 10,000 rpm, but because it is a somewhat elastic limit, the "red line", our efforts would be directed toward was set at 10,000 rpm. The validity of this pencil-predicted limit is substantiated by the experiences of Frank Scurria, who has raced Ducatis with some success and who found a 10,000 rpm red-line to give reasonable reliability.



Dotted line on cylinder head cutaway at left shows new port shape. Underside view of head above shows larger port blended into valve seat.

Once the upper limit was set, it then became a simple matter to determine the engine speed-range; this being calculated from the ratios provided in the standard Ducati 5-speed transmission. To make the rather large jump from 1st to 2nd without dropping below the power band, power is required from 6500 rpm. However, on most race courses, one would not use anything under 2nd gear except on the start, so the real power band could be between 8000 and 10,000 rpm - that would cover almost any course and overall gearing conditions we would be likely to encounter.

Knowing how "peaky" power curves become in highly modified engines, we could estimate that with everything tuned for running in a 8000-10,000 rpm range the point of maximum output would be about 9500 rpm. From that point, it was all fairly easy slide rule work to arrive at an inlet valve and port size, and a diameter for the carburetor throat

First to come in for consideration was the intake port diameter. This should be large enough to avoid throttling; yet, small enough to provide the gas velocity needed for good cylinder charging over a fairly wide engine-speed range. Experimental work has shown that gas-flow speeds in the order of 400 fet per second give good results and a couple of racing engines have used even higher gas speeds. However, some degree of throttling occurs as the flow nears 400 ft/sec, and as we were dealing with a 5-speed transmission, it was not necessary to spread the power band very far. Therefore, we could settle for a narrower range and gain slightly in maximum power. Calculations showed that a port diameter of 1 3/16" would give us a maximum mean gas speed of 380 ft/sec at 10,000 rpm, with a minimum of 307 ft/sec down at 8000 rpm. The lower figure is still high enough to dampen the power-band narrowing effects of moderately radical racing cam.

At the carburetor, there is no need for having more gas velocity than is necessary for proper air/fuel mixing. In fact, to maintain the high port-area gas velocities out through the carburetor is to incur entirely unnecessary flow losses due to friction. Our ultimate choice of carburetors, an Amal GP5 with 1 3/8" throat, gives a maximum flow velocity of 283 ft/sec, which is low enough to make flow restriction minimal and high enough to give completely clean carburetion. Down at the 6500 rpm minimum, gas speed through the carburetor is only 184 ft/sec, and rather borderline for clean running, but acceptable.

Valve size was determined by the interaction of many factors. Contrary to some opinion, biggest