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BICYCLES and
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THE ENFIELD CYCLE COMPANY LIMITED

HEAD OFFICE AND WORKS

REDDITCH

WORCS. ENGLAND

Your Ref.

Our Ref. RAW-J/MB

25th October, 1961

Major F.W. Smith
Major V.T. Mountford
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BURNING OF EXHAUST VALVES PARTICULARLY ON 350 CRUSADER ENGINES

As mentioned in the Development Report for the month of September, the number of burnt exhaust valves seems to be increasing. The prototype 350 Crusader engine in particular has burnt three valves in approximately 5,000 miles running, the life of the valves in this engine apparently becoming shorter as the test proceeds.

When the cylinder head was removed to replace the third burnt valve, an oil leak was noted between the fins adjacent to one of the holding-down nuts. The cylinder head has been replaced and the old head has been sectioned showing that the metal is extremely thin at this point due to the extra depth of recesses for the nuts. This extra depth was given to enable the cylinder holding-down studs to be short enough to permit the barrel to be lifted clear of them when the engine is in the frame.

At the suggestion of Mr. Mincher-Lockett of Motor Components Ltd., (who supply the valves) some tests have been made to see whether these valve seats distort when the cylinder head nuts are tightened. A substantial cast iron ring was bored to receive the spigot portion of the cylinder barrel drilled and tapped for the cylinder holding-down studs. The cylinder barrel, gasket and head were then assembled onto this and the valve seats checked for leakage before and after tightening the cylinder head nuts.

It was found that whereas with the standard Crusader Sports head no leakage

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BURNING OF EXHAUST VALVES PARTICULARLY ON
350 CRUSADER ENGINES (CONT..)

occurred after tightening down the five nuts and the two Allen screws, leakage occurred at the inlet valve seat on the 350 Crusader as soon as the five nuts were tightened, and on the exhaust valve seat as soon as the two Allen screws were tightened.

Distortion of the cylinder head when the nuts and the Allen screws are tightened is, therefore, a contributory cause of burning of the exhaust valves on the 350 Crusader engine. The engine is now being assembled using a Crusader Sports cylinder head with longer studs. For production this will necessitate inserting wire inserts in the stud holes in the crankcase as is done on the 500 Bullet.

Clearly this is not the only cause of burning since burnt valves have occurred on Crusader Sports and also on 350 Bullet models. A piece of a burnt valve, reported by Messrs. Motor Components Ltd. as being of the correct material, has been sent to N.I. Technical Developments Ltd. for check analysis and another valve from a 350 Trials model which burnt after only 600 miles running has also been sent to N.I. Technical Developments Ltd. for analysis.

.....*R.A. Wilson-Jones*.....
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