Manufacturers of Royal Enfield BICYCLES and MOTOR CYCLES

Telegrams CYCLES, PHONE, REDDITCH

Telephone REDDITCH 4222 (9 Lines)

THE ENFIELD CYCLE COMPANY LIMITED

HEAD OFFICE AND WORKS
REDDITCH
WORCS. ENGLAND

Your Ref. Our Ref

3rd July, 1962

Mr. P. Taylor
Major V.T. Mountford
Mr. V.L. Young
Mr. J.J. Booker
Mr. G.H. Baker
Mr. R.E. Thomas
File

REPORT OF DEVELOPMENT WORK IN PROGRESS
JUNE, 1962

(Sub-section Nos. 1 - 19 refer to Minutes of the Meeting held on Friday, 15th June, 1962. Mileages are at 3rd July, 1962)

1. Spindle Mounted Front Mudguard

Scheduled a/o 750 sets

The cast Aluminium fitting which supports the stays on the right hand side of the guard has given no trouble. After 2,957 miles, including 30 miles on the Pavé at M.I.R.A. the horizontal stay on the left side of the guard broke close to the welded-on bracket which attaches it to the brake cover plate. The design has now been modified at this point.

2. 750 cc Engine

Details of comparative speed and acceleration tests between the 750 and 700 cc machines have been given in a separate report dated 21st June, 1962.

The prototype engine which was removed from the frame when the production engine was fitted is being used for further oil consumption tests on the bench with and without expander rings behind the dual oil control rings.

Mr. Spenser raised the question as to whether we can supply oversize

/Cont....

2. 750 cc Engine (Cont..)

pistons for the 750 cc engine. A piston .020" oversize for this engine would equal an oversize of .060" for the 700 cc. Messrs. Hepworth & Grandage stock .060" oversize pistons and rings so there is no difficulty in obtaining .020" oversize pistons for the 750 cc engine. On the other hand, the cylinder walls are already .020" thinner than with the 700 cc engine and in fact the spigot portion of the cylinder barrel has the walls reduced rather more than this, owing to a local reduction in external diameter having been necessary in connection with the steel strips which are now inserted into the crankcase to prevent oil leaking past the spigots from the cam tunnels. Whether the cylinder walls would stand further reduction of .010" in thickness (caused by boring out to .020" oversize) seems doubtful. A thick cast iron plate has therefore been prepared with a hole bored through it to receive the cylinder sprocket and tapped holes to receive the lower ends of the cylinder studs. The cylinder head and barrel can be mounted on to this cast iron block and the bore of the cylinder measured to show up any distortion which may be occurring. This has been done but no serious distortion has been detected. In fact the measurements of the cylinder bore when the head nuts are tightened to 22 ft/lb torque are more uniform than when the nuts are left slack. It is therefore concluded that these barrels can reasonably be bored out .020" oversize.

It was, however, noted that when the cylinder head nuts were tightened the inlet valve seat apparently distorted causing a slight leak which persisted after the nuts were released.

No report has yet been received from the 5-speed gearbox which was returned to the Albion Engineering Company with a complaint of leakage. I have urged Mr. Hill of Albions to let us have this report. If no reason for the leakage can be found other than the fact that with this box we rely on a single oil thrower at the main shaft main bearing, a possible way to ensure freedom from leakage through this bear ing would be to use a type of bearing incorporating an oil seal. These are available but their use is not desirable unless it is essential both on the grounds of cost and probably delay in getting the bearings.

3. New Heavyweight Frame

No comment.

4. Silencing

No further tests have been run since the last report.

/Cont....

5. Crusader 350 cc

This is running satisfactorily, the mileage since the last re-build being 2,348. Samples of production pistons have been received and approved subject to the top land being made .003" smaller.

6. 175 cc Engine

Prototypes
Front - 4" DIA
Rear - 1.9" DIA
= .26" up at front

Mr. Thomas is progressing with the design of the complete machine as quickly as possible. Agreement has been reached with the Dunlop Company regarding tyre sizes. The Dunlop Company will consider laying down a mould for a 3.25/17" light-weight reinforced studed tyre and also one for a 3.00/17" light-weight ribbed tyre for the front wheel. We would, however, accept 3.25/17" light-weight ribbed for the front tyre if necessary. The first prototype machine will use a 3.25/16" light-weight reinforced studed tyre on the rear wheel and a 3.00/16" universal tyre on the front wheel, these being the nearest sizes available at the moment which will not materially alter the attitude of the machine.

7. Scooter

Mr. Yate of Siba reports that the damage to the brushes in the dynostart unit fitted to the scooter engine was due to :-

(a) the commutator strips being distorted by the use of contact breaker screws which were too long;
(b) the presence of an excessive amount of oil which is known to cause rapid brush wear. This oil is known to be due to blow back from the carburettor;
(c) incorrect lateral positioning of the rotor and stator which resulted in the brushes being half out of their boxes before any wear had taken place and coming right out of them as soon as they were half worn.

In order to make the unit capable of being run, I have asked Mr. Yate to rectify the commutator and return the unit to us

8. Batch Tests

Results of a batch test on a Constellation compared with a 750 cc Interceptor have been published as a separate report.

9. Overoiling on 250 cc Engines

The modified discs with the groove connecting the feed pump delivery port to the centre recess have been fitted to three machines - the one with the Siba starter, the prototype 350 Crusader and the Super-5 machine.

/Cont....

9. Overoiling on 250 cc Engines (Cont.)

The Super-5 was used for high speed work on the No. 2 Circuit at M.I.R.A. during which it used 8 pints of oil in 120 miles. After changing to a standard pump disc practically no oil was used in 220 miles under the same conditions.

Strong spring fitted?

The two special discs and gear pump referred to in the Minutes of the last meeting have not yet been received.

10. Sports Airflow

This has now been announced to the dealers.

11. Siba Self Starter

The modified crankshaft sleeve has now been fitted and the machine is again in use and performing satisfactorily, having covered 283 miles since the sleeve was fitted.

12. Lucas Self Starter

Work is proceeding with the adaptation of the Lucas 12v. constant mesh starter to a 250 cc machine.

13. Miller Lighting Set

Mr. Michael Miller has recently sent an automatic advance cam to give 30° advance. This will be fitted on a machine with the Miller equipment. It will be recollected that the original Miller unit gave only 22° advance as compared with 25° for the average Lucas unit. A sample Lucas unit giving a longer range was tried but tests on this were discontinued owing to the high cost involved by any departure from standard on Lucas equipment.

14. I have asked Mr. Phillip Wood to check on progress of the 12v. equipment. The reply was that no progress had been made at present.

15. Molybdenum Pistons

The aluminium barrel to standard limits has been received and the smaller of the two molybdenum sprayed pistons has been run in it on the test bench for 17½ hours at speeds up to 3,250 r.p.m. The engine ran satisfactorily but when stripped there was a considerable amount of scoring in the barrel where the skirt has been in contact with it.

16. Clutch Drum

As these have been approved there is no need for further comment

/Cont....

16 Clutch Drum

except to remark that the Glacier 'DU' bearings are still in excellent condition. Consideration is now being given to modifying the clutches for 500, 700 and 750 cc twins.to use these bearings.

17. Morse Chains

These have been fitted to a 700 cc Constellation and to a Crusader Super-5. No miles have been run on the former since the chains were fitted. The Super-5 machine is at present in the hands of a representative of "Motor Cyding"

18. PTFE Bearings for Main Pivot of Leading Link Forks

There is no standard Glacier 'DU' bearing having a $\frac{3}{4}$" bore which is long enough for this application. Two short bearings with a spacer or a special bearing bush would therefore be necessary. In addition it would be necessary to have DU coated thrust washers in place of the ordinary mild steel washers. The whole assembly is therefore likely to be rather expensive. It would seem therefore desirable to investigate the alternative possibility of omitting the bronze bush and thrust washers altogether, boring the link itself to $\frac{3}{4}$" and leaving it sufficiently wide to operate without thrust washers. The whole of the pivot end of the link or possibly the whole of the link could then be treated with Glacier DG treatment which will operate without lubrication.

19. Super-5 and Crusader Sports Pistons

See my comprehensive report on this subject dated 28th June.

The Super-5 piston has been fitted with a scraper ring .001" narrower than standard and has been run for a distance of 566 miles including 120 miles at high speed on the No. 2 Circuit at M.I.R.A. and the remainder in high speed road work. During this test ordinary Premium petrol was used, not 100 octane. The scraper ring remained free in its groove. After removal of this ring, however, it was found that a standard width ring was also free and that no trace of collapse of the groove could be found. It is obvious therefore that the test does not reproduce the conditions which obtained in customers' machines where collapse of the scraper ring groove and nipping of the ring has occurred.

A Constellation piston has been reworked with modified valve clearance slots and run for a total distance of 300 miles including 220 miles at high speed on the No. 2 Circuit at M.I.R.A. No collapse of the crown has occurred. In view, however, of the failure to cause collapse of the scraper ring groove in the Super-5 piston referred to above it was felt doubtful whether this piston has yet covered sufficient high speed running for us to be satisfied that these light piston castings are safe even when the modified valve clearance slots are cut on them.

/Cont... .

20. Light Alloy Cylinder barrels

In addition to the Molybdenum sprayed piston run in an unlined cylinder barrel referred to in Sub-Section 15, two aluminium cylinder barrels with metal sprayed coating in the bore have been run on the 250 machine fitted with the Siba Starter. The first of these was sprayed with molybdenum and honed to .002" undersize and run with a standard piston. This covered a total distance of 3,402 miles part of which was on another machine. The general condition of both cylinder bore and piston looks very good. The maximum wear recorded is at the top end of the barrel where it is .0013" in line with the gudgeon pin and .0028" fore and aft across the thrust faces. A plain unchromed top ring was used for this test as it was thought probable that a chrome ring would not be compatible with the molybdenum cylinder. This rate of wear is rather heavy by modern standards.

The machine with the Siba Starter is now fitted with a barrel which has been sprayed with nickel steel with a molybdenum bond. This was fine bored and honed on our normal tackle leaving the bore .002" undersize and is now running with a standard piston with a chrome plated top ring. So far the machine has only covered 303 miles since this cylinder and piston were fitted. It is performing very well and was driven hard immediately after fitting the new barrel with no running-in. This seems to be the most satisfactory way in which we can use aluminium cylinders. We could do the spraying ourselves or get it done. The only point to watch is that the thickness of wall coating must be sufficiently thick to ensure that the bore cleansup. A sample cylinder was sprayed for us by Messrs. Metco who at the first attempt did not provide sufficient thickness of wall. The coating had to be turned off which is difficult on account of the hardness of the molybdenum bond and was then re-sprayed. At one or two points it has barely cleaned up when finished to the required size. The great advantage of this method is that prior to coating only a normal bored finish is required and that final finishing after coating can be done with our normal fine boring and honing tackle. Completely standard pistons can be used.

21 Shorter Brake Linings.

Following a suggestion made in a paper read at the F.I.S.I.T.A. Congress, a pair of brake shoes has been modified to reduce the area of contact of each lining to approximately 60°. This is stated to give smoother braking minimising the risk of grabing or judder. These are fitted initially in the front wheel of the 250 cc machine with the Siba Starter which has a tendency to judder when the brake is applied hard due apparently to a small amount of play in the hub bearings.

.....R.A. Wilson-Jones.....
(R.A. Wilson-Jones)