



Telegrams
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Manufacturers

of
Royal
Enfield

BICYCLES and
MOTOR CYCLES

THE ENFIELD CYCLE COMPANY LIMITED

HEAD OFFICE AND WORKS

REDDITCH

WORCS. ENGLAND

Your Ref.

Our Ref.

5th September, 1961

Major F.W. Smith
Major V.T. Mountford
Mr. V.L. Young
Mr. J.J. Booker
Mr. G.H. Baker
✓ Mr. R.E. Thomas

REPORT OF DEVELOPMENT WORK IN PROGRESS

AUGUST, 1961

(Sub-Section Nos. refer to Minutes of meeting held on 4th August, 1961)

1. Pressed Steel Fork Head and Leading Link Fork

We are still waiting for castings for the ball head clip and pressings for the head lamp casing. The ball head clips are now promised for the second week in September. Tools for the head lamp casing will not be ready for two to three weeks.

Mr. Baker reports that he is pressing on with the jigs and fixtures. Stampings for the fork links have been received but owing to the need to concentrate on the jigs the sample pair for test have not been machined.

The prototype leading link fork has now been run a distance of 2,019 miles.

2. Lubrication on 700 cc Engines

The engine modified to open the cam tunnels to the crankcase has now covered 25 hours on the test bench at 4,000 r.p.m. (equivalent to 70 m.p.h. on top gear) and 1,014 miles on the road. The condition of the cams and cam followers is satisfactory.

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3. 750 cc Engine

This has been fitted into an old type frame with seat tube to see whether this lessens the vibration. The most noticeable effect is that vibration on the footrests is worse than in the modern frame. This suggests that for the old type frame a lower balance factor may be preferable.

4. Silencing

A series of power tests on a Crusader Sports engine was run on 26th July using a variety of silencers including our standard silencer, a modification of this with glass wool packing, a Burgess silencer (as used on the Super Meteor), four silencers submitted by Dr. P.O.A.L. Davies of Southampton University and Mr. E. Murray's silencer consisting of a spring loaded pot lined with rubber fitted over the end of a Burgess silencer. Mr. Davies was present and brought a Sound Level Meter with him. Owing to the high level of sound inside the test house, the Sound Level Meter had to be outside. This fact, combined with the different positions of the exhaust outlet with the various silencers (some pointing downwards, some to the rear and one forwards) makes comparison between the recorded sound levels of doubtful validity. There is no doubt, however, that the standard Enfield Silencer is the noisiest, the experimental Enfield is quieter, the Burgess quieter still and the Davies and Murray Silencers very much quieter. These, however, cause power losses which at the present time must be considered to be unacceptable. The Davies silencers are, moreover, very unconventional in appearance while the Murray silencer has the disadvantage of a moving part and has been found, in its present form, to be incapable of standing up to the heat created by full throttle running, especially on a 700 cc twin.

The best power was obtained with the Burgess silencer and the next best with the experimental Enfield. Both these silencers are, therefore, better for both power and silence than the standard Enfield. The Burgess silencer has the drawback that it contains glass wool packing which must be inserted before the silencer is plated. In the experimental Enfield silencer the glass wool can be inserted after plating. This silencer, together with the Murray and one of the Davies silencers, was power tested on a Constellation engine at the conclusion of the tests on the Crusader Sports engine. The results of all these tests are given and discussed in detail in a separate report.

At the conclusion of these tests the glass wool packing in the experimental Enfield silencer was found to have partly disappeared,

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4. Silencing (Cont..)

(probably during the power test on the Constellation) and to be concentrated towards the outlet end of the silencer. Further tests have now been run using a split cartridge fibre glass packing. This appeared to be too closely packed to give the best silencing and after 20 hours at 5,000 r.p.m. had 'burnt' along the longitudinal split and at the ends.

The silencer has now had the annular space round the perforated tube divided into two equal sections by a central flange and has been packed with 'Cosi Wrap' fibre glass material. These seem to be better than the cartridge packing from the point of view of noise. After 9½ hours at 5,000 r.p.m. the packing was in reasonably good condition apart from slight 'burning' in the vicinity of each of the three metal flanges. This silencer has now been fitted to a Constellation machine which will be run for about 300 miles during the week-end.

Particulars have been obtained of a small portable 'Sound Survey Meter' made by the General Radio Company of U.S.A. (price £88) and of a 'Sound Level Indicator' made by Dawes Instrument Company (price £45). It is recommended that we should purchase the latter instrument.

5. Pistons for 'Crusader Super 5'

These are not due till the middle of the month.

6. Five Speed Gear Boxes

The heavy weight box has now covered 1,010 miles on a Constellation. The original 5-speed gear on a Crusader has now covered 5,868 miles.

7. 350 Crusader

This has now covered a total of 3,784 miles. The 5-plate clutch with steel drum, J 17 things and Glacier 'DU' bearing has covered 627 miles. This shows a slight tendency to drag - just enough to make the finding of neutral difficult at times. This, however, is probably due, not to the 'DU' bearing, but to the clutch centre not being wide enough so that although the pressure plate and the first friction have ample movement, the movement of the remaining plates is restricted. Two longer clutch centres are being made, being at the moment held for grinding.

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7. 350 Crusader (Cont..)

A malleable iron drum and sprocket and set of plates faced with the Armstrong Cork Company's 8169 material are ready for assembly as soon as the centres are finished. A second malleable iron drum is still with the Cork Manufacturing Company to be faced with U.17 material. When all these parts are available we shall be able to have three clutches with 'DU' bearings running - two 5-plate with M.I. drums and one 4-plate with the steel drum and cork inserted plates.

Messrs. Glacier Company have agreed to reduce their price for three sample 'DU' bushes $1\frac{3}{8}$ " long (enough for four clutches from each bush) from 78/8 each to 7/6 each. The price quoted for production bushes $2\frac{1}{4}$ " long (enough for six clutches) is 8/10 each for lots of 167 bushes (enough for 1,000 clutches) plus a tooling charge of £15.

The engine is at times very noisy mechanically but it is not fair to comment on this until a new cylinder barrel and piston with the correct clearances have been fitted. The sample pistons from Automotive Engineering should be delivered during this month. Now that upturned handle bars and leg shields have been fitted, the machine is not a great deal faster than the 350 Bullet. It is, however, a great deal smaller and lighter and presumably cheaper to produce. The original chains are still in use and there has been no recurrence of the gear and valve failures at 1,367 and 1,788 miles respectively.

Enquiry from Mr. Hill of Albions elicited the information that the strengthening of H.J. gears for this machine consisted of widening the second and third gear pinions. Nothing was done to the high gear lay-shaft pinion which failed. This pinion is made of a direct hardening steel and is not really suitable for a case hardening steel because of a rather thin shroud carrying the teeth into which the kickstarter pawl engages. The O/D of this shroud would have to be turned to size before carburising to enable the main gear teeth to be cut. A possible method would be to turn the shroud to size, cut the teeth and stop off the outside of the shroud by copper plating. This, however, would have to be kept away from (or removed from) the adjacent gear teeth before carburising. We have recently had a few instances of this type of failure after thirty years satisfactory experience with H.J. gears. The probable explanation is that a batch of gears has gone through which has been tempered at too low (or too high) a temperature either of which will cause brittleness.

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8. 250 cc Frame with 'B' Quality side Tubes

The test on this has been commenced. The machine has covered 309 miles on the road and 30 miles on the Pavé. At the present time the first leg of the Pavé is apparently being relaid which means that of the $1\frac{1}{2}$ mile lap only 1 mile is on Pavé. Unfortunately, the first leg contains most of the worst bumps so that even if the 50% extra number of laps are covered it is doubtful if the test is as severe as before.

9. 175 cc Engine

Mr. Thomas has done some work on a design for an overhead camshaft design with a chain drive giving the 2 : 1 reduction. This needs a gear, preferably a skew gear, to drive the oil pump and there is some difficulty in providing a drive for the contact breaker.

Mr. Thomas has now nearly completed an arrangement drawing showing a spur gear giving the 2 : 1 reduction with a 1 : 1 chain drive. The $\frac{1}{2}$ -speed shaft provides a drive for the contact breaker and a second gear wheel meshing with the small pinion drives the oil pump. This arrangement seems the most promising so far.

10. Siba Self Starter

This has been fitted up with the special switch, etc., and four standard Lucas MLZ9E batteries operating the starter at 24 v. This turns the engine over at a fair speed even against full throttle but fails to fire the charge unless the throttle is on, or just off, the stop. This is an improvement on the 12 v operation which, unless the batteries are fully charged fails to rotate the engine against anything more than about $\frac{1}{4}$ throttle. The use of larger batteries does nothing more than delay the time where the starter stalls if the throttle is opened too wide. Stalling the starter is, of course, the quickest way of running the batteries down.

11. Aluminium Alloy Cylinder Barréls.

One chromium barrel Ref. B (deposit .025" thick) has now run 1,631 miles. It is showing wear up to about .0015" at the top end of the barrel and up to about .0008" at the lower end. Everywhere else it shows no wear at all although the uneven surface produced by hand polishing is becoming apparent. Since the barrel was originally small at both ends this means that wear has taken place where the clearance was insufficient or in other words that the piston is lapping the barrel to the correct shape.

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13. Batch Tests (Cont..)

Meteor Minor De.Luxe

Standard Aiding Position - West 82.30 m.p.h.

Using Pillion Rests West 86.04 m.p.h.

Note :-

Timing equipment not functioning on the East run. By analogy with the 250 Clipper tests the speed on the East run, using pillion rest, would be at least 90 m.p.h.

Consumption at 45 m.p.h. - 61.5 m.p.g.

Super Meteor with Bugmar Sidecar (Hood Up)

West - 62.17 m.p.h.

Note :- Probable East speed 68 to 70 m.p.h.

Consumption at 45 m.p.h. - 57.5 m.p.g.

14. Nylon Idler Gears

Nothing further to report. The 350 Bullet with Nylon Idlers is at present on loan to the A.C.U.

15. Sports Airflow Fairing

Awaiting report from Mr. J.J. Booker.

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