

3/6/64

250cc RACER MK II

Reynolds Frame (Duplex), Enfield-Alpha Engine, Albion 4 speed

ENGINE SPROCKET 25T, Duplex $\frac{3}{8}$ " pitch

Clutch 54T, 3 plate.

C/Shaft 19T,

Rear Sprocket 40T = 4.55

41T = 4.66

42T = 4.77

43T = 4.88

44T = 5.0

45T = 5.11

46T = 5.23

47T = 5.34

48T = 5.45

Top Gear

Primary Chain N° 114038 x 82 pitches (endless)

Duplex $\frac{3}{8}$ " pitch x $\frac{1}{4}$ " dia roller x $\frac{1}{8}$ " wide.

Centre distance = 7.794"

Thickness of packing block between engine & gearbox = 2.375"

Primary chaincase made from Clippier W. 39964

2 MK Batteries (as on Turbo Twin) used.

Armstrong Springboxes - 80cc

Set ~~Rear~~ Springs to $5\frac{1}{4}$ " long. 85/16c/2.

14 Sep 64

Oil Circulation of 250 Crusader.

$\frac{1}{8}$ " dia plunger, $\frac{3}{8}$ " stroke, $\frac{1}{2}$ engine speed.

Oil Circulation at 1000 revs/min of engine
= 498 galls / hour.

34 $\frac{130}{43}$

170
1530

Weight on Rear Wheel = 120 lbs.

Deflection at 120 lbs = $\frac{3}{4}$ "

\therefore Rate at Rear Wheel = 160 lbs/in.

Leverage between Spring & Rear Wheel Spindle = 3:1

\therefore Rate of Spring = $160 \times 3^2 = 1440$ lbs/in.

Load at maximum deflection of Spring, i.e. $\frac{3}{4}$ " = 1080 lbs

This equals $2\frac{1}{4}$ " full movement of Rear Wheel ($1\frac{1}{2}$ " bump, $\frac{3}{4}$ " rebound)

Mean diameter of spring = 1"

Max Stress = 80,000 lbs/sq in.

$$d^3 = \frac{P S D}{\pi S} = \frac{1080 \times 8 \times 1}{\pi \times 80,000} = .0344$$

$$d = .324" \text{ (O.S.W.G.)}$$

$$N = \frac{G d^4}{8 D^3} \times \frac{1}{1440} = \frac{11,500,000 \times .324^4}{8 \times 1^3 \times 1440} = 11$$

$$\frac{D}{d} = \frac{1}{.324} = 3.08 \quad \text{Wahl Factor} = 1.55$$

$$S = \frac{1080 \times 8 \times 1}{\pi \times .324^3} \times 1.55 = 125,000 \text{ lbs/in Corrected Stress.}$$

$$\begin{aligned} \text{Free length} &= (11 \times .324) + (.324) + \frac{3}{4} + \text{lengths for attachment} \\ &= 4.638 + \text{lengths for attachment} \end{aligned}$$

R. H. Helix - 6" long spring allows $\frac{1}{16}$ " each end for attachment
Total No of Coils = $14\frac{1}{2}$ end to end (open ends)
~~1.330 / 1.320~~
Max $\phi/d = 1.334$, Min $\phi/d = .666$

Rear Spring

Min Inside Dia .666"

Max Outside Dia - 1.334"

Free Length = 6"

Rate = 1440 lbs/in

Solid Height =

Material EN 49 BorC?

Ends open and NOT ground.

Wire dia .324"

Total No. of coils = $14\frac{1}{2}$

∴ working coils = 11

Max Corrected Stress = 125,000 lb/sq in

RH Helix

(Midlane Springs, George St)

Mr Green

Redditch 3162

Bicycle

Weights Machine 40 lbs

180 lb Rider	76 lbs on F Wheel	150 lbs on R Wheel
140 lb Rider	64 lbs on F Wheel	116 lbs on R Wheel

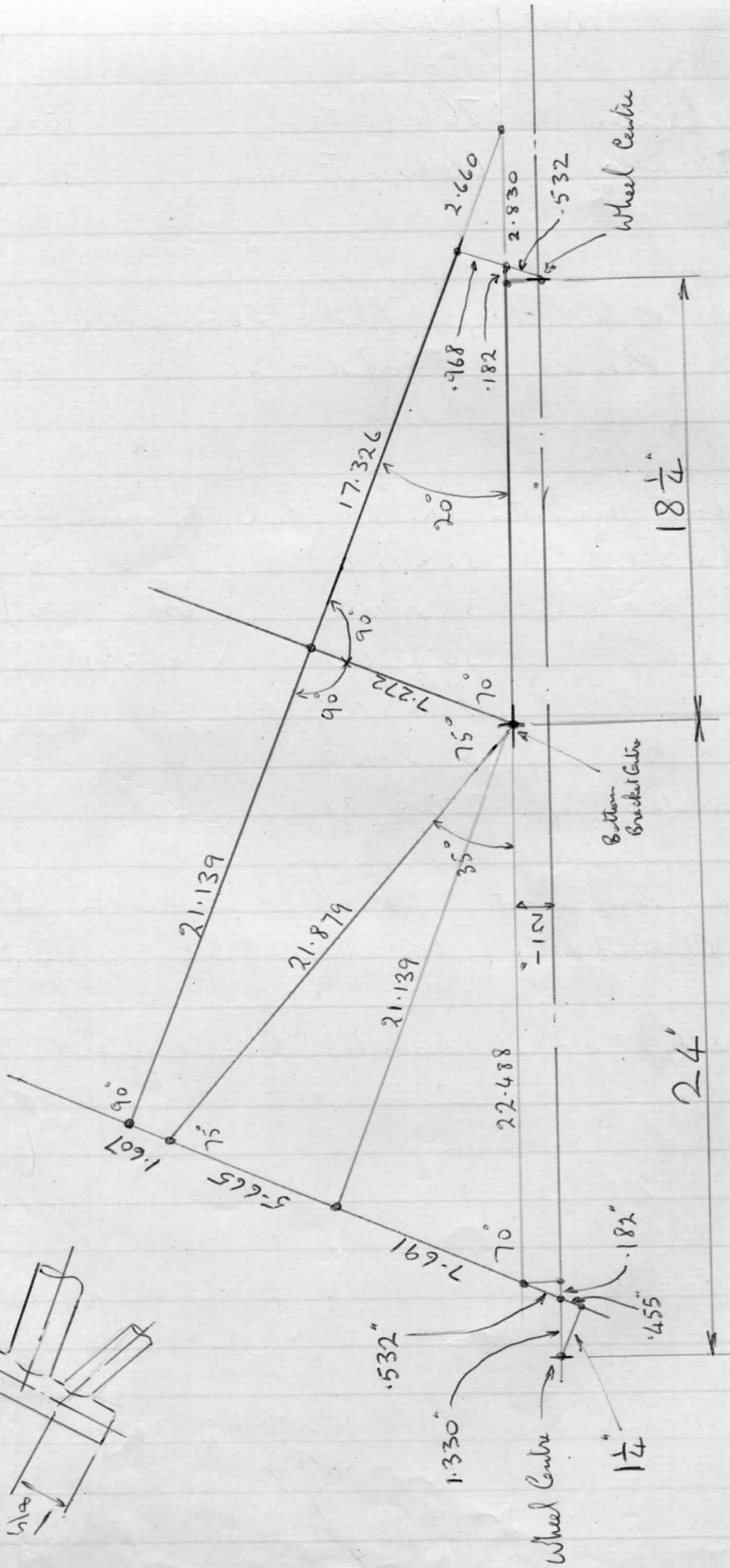
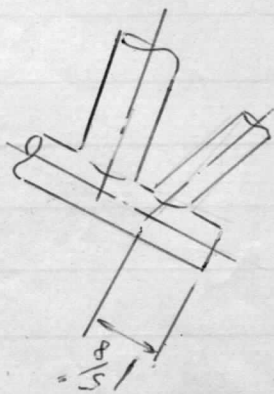
Standard Touring Ratios, 26" wheel - 46 chainwheel 18 Rear.
Prince, 20" wheel - 32 " 18 "

Equivalent gear ratios for 20" wheel to equal 46 x 18 with 26" wheel =

46 x 13.8	52 x 15.6	58 x 17.4
47 x 14.1	53 x 15.9	59 x 17.7
48 x 14.4	54 x 16.2	60 x 18
49 x 14.7	55 x 16.5	
50 x 15	56 x 16.8	
51 x 15.3	57 x 17.1	

Minimum Rear Sprocket available to fit standard freewheel = 16 T
Max Chainwheel with 6 1/2" cranks = 52

52 x 16 = 3.25 : 1 instead of 3.34 : 1 required.



12TH OCT 1964

L.H.D. MK I BICYCLE

FRAME GEOMETRY

Jig & Tool Designers

28/9/64

MIDLAND DESIGN & MANUFACTURE
HEATH MILL RD,
WOMBOURNE,
WOLVERHAMPTON

VITAFORM 061 MID 4301 } MR JAWSON
MANCHESTER

ACUMEN - MR STRONG EAST 0487

6th October 1964

Scrambler leading link Front Fork

4th Set. of Springs

MIN INSIDE DIA.	1.01"
MAX OUTSIDE DIA	1.46"
FREE LENGTH	11"
RATE	62 lbs/in.
MAX SOLID HEIGHT	5.72"
MIN WORKING LENGTH ^{LENGTH}	5.72"
MATERIAL	EN 49BORC
WIRE DIA	.212"
WORKING COILS	25
TOTAL COILS	27
MAX CORRECTED STRESS	136,000 lb/sq ins.
ENDS CLOSED & GROUND	

MR BUDGEN - AUTO SPRINGS, REDDITCH 5161

Speedwell

GT 90 Front Section of Rear Guard.

9/10d + 1/11S tools = 237-18-4 per 250 (requires 403 sets to equal 2nd)

29 / OCT / 64

Stevens Lubrication Central 4841

Nylon Tubing

100' / 5-1-6

100'-250' / 4-5-0 per 100'

250'-500' / 3-5-0 per 100'

YAMAHA

MJ 2

55 cc

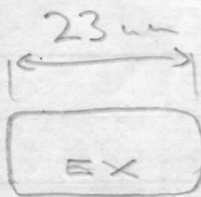
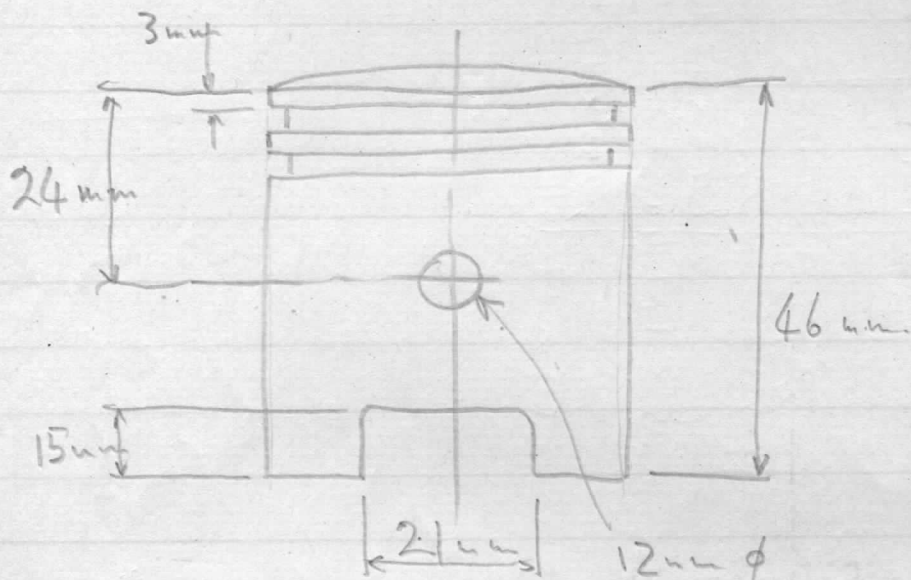
7.4:1 CR

42 bore x 40 stroke

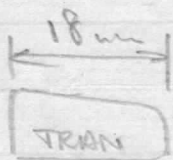
50 HP / 7000

3 speeds

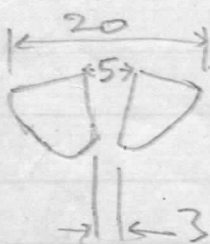
20:1 petrol



opens 11mm B.B.D.C.



opens $6\frac{1}{2}$ mm B.B.D.C.



Disc inlet opens $29\frac{1}{4}$ mm B.T.D.C.

disc $29\frac{3}{4}$ mm A.T.D.C.

} 60mm inlet dia.

3 Rollers $\frac{7}{16} \phi \times \frac{7}{16}$ long on chain links, $\frac{1}{2}$ pitch

Steel roller track
 $\frac{1}{16}$ thick pegged on drum.

Cutaway to miss links

Steel
 Centre with
 splines and
 alloy drum cast on.

3 springs

1" free length, 47.6°

$8\frac{1}{2}$ coils end to end
 Squared & ground ends

$15\frac{1}{2}$ g (-0.08)

Compressed to $.67$ "
 in disengaged position

3 function plates, slotted faces
 slots $\frac{1}{16}$ wide, $\frac{3}{16}$ wide lands
 $\frac{1}{8}$ thick on $\frac{1}{16}$ thick plate -
 32 internal teeth

3 supports for eviching

PRIMARY RATIO 19-74

3 steel plates, 2 inner $.045$ thick
 1 outer $.055$ thick

Retaining plate $\frac{1}{16}$ thick with 6 tongues $\frac{9}{16}$ wide

6 plate separating springs 190°

$23\frac{1}{32}$ " free length, 13 coils end to end
 ends ground & squared

About 21 away

$\frac{3}{32}$ " clearance in free position.
 of $\frac{3}{16}$ "

Yamaha Clutch

30/Nov/1964

Roller Center has total movement

Junior Revelation

5-3-65

16" dia tyres (16 1/2" actual dia)

36T Chainwheel

4 1/2" crank.

14T Rear Sprocket

= 41 gear.

$$\frac{36T}{14} = 37 \text{ gear}$$

$$\frac{32T}{36T} = 36 \frac{1}{2} \text{ gear}$$

JB Bicycle

24" dia tyres

40T Chainwheel

5 1/2" crank

18 T Rear Sprocket

= 53 gear.

} equivalent to

16

38

4 1/2

14

= 43 1/2 gear

Primer

20" dia. tyres

32 T Chainwheel

~~18~~ 4 1/2" crank

18 T Rear Sprocket

= 35 1/2 gear

} equivalent to

16

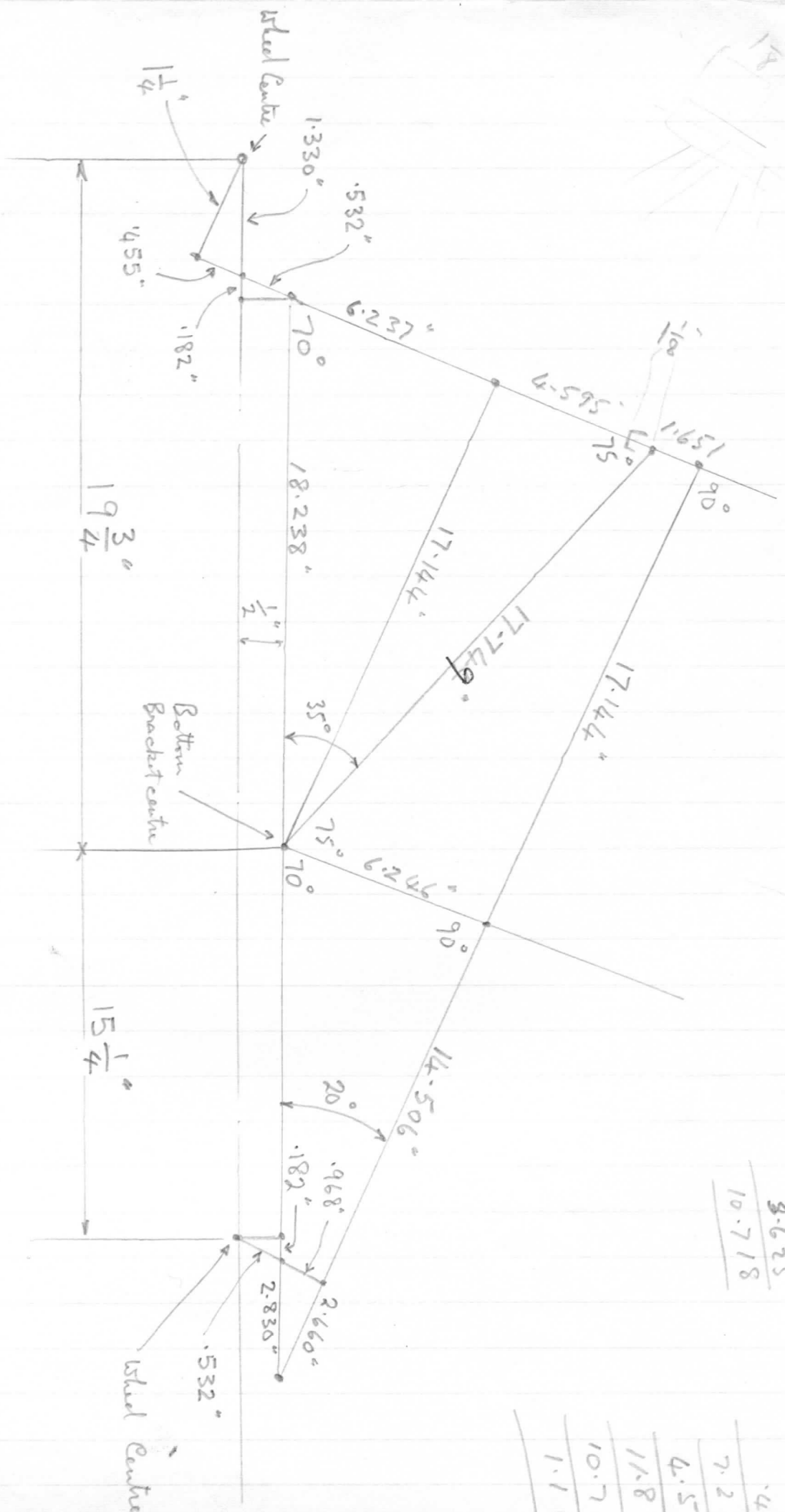
31

~~18~~ 4 1/2

14

= 35 1/2 gear

$$\text{Gear} = \frac{\text{Wheel dia} \times \text{Chainwheel}}{\text{Rear Sprocket}}$$



Junior Revolution

14.343
 3.625
 10.718

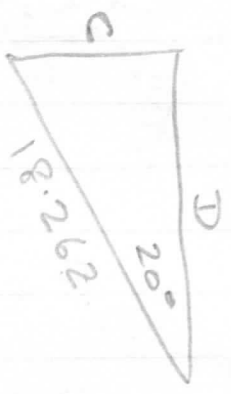
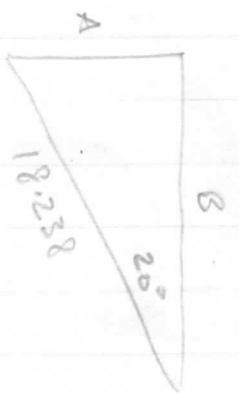
6.237
 .532
 4.55
 7.224
 4.595
 11.819
 10.718
 1.101

1.330
 .182
 1.512

19.750
 1.512
 18.238

15.250
 .182
 2.830
 18.262

6.246
 4.595
 1.651



$A = \sin 20^\circ \times 18.238 = .342 \times 18.238 = 6.237''$

$B = \cos 20^\circ \times 18.238 = .940 \times 18.238 = 17.144''$

$C = \sin 20^\circ \times 18.262 = .342 \times 18.262 = 6.246''$

$D = \cos 20^\circ \times 18.262 = .940 \times 18.262 = 17.166''$

$E = \tan 15^\circ \times 17.144 = .268 \times 17.144 = 4.595''$

$F = \sec 15^\circ \times 17.144 = 1.035 \times 17.144 = 17.749''$

5252

15.250
 .182
 2.830
 18.262

14.50
 2.66
 17.16

17.74404
 51432
 8572
 514
 17.74918

17.16
 1.03

Explorer

24" dia tyres	16	16	16	16	16
40 T Chainwheel	60	46.7	42.4	40	42
18 T Rear Sprocket	18	14	14	14	14
5 1/2" crank	5 1/2	5 1/2	5	5 1/2	5 1/2
53.3				45 3/4	48

Mini Rev

16" dia tyres	16	35	36		
42 1/2" Chainwheel	14	4 1/2	4 1/2		
14 T Rear Sprocket	40	41			
5" crank					

Prince

20" dia wheel	16	16	16	16	16
32 Chainwheel	40	31	36 1/2	38	42 40
18 T Rear Sprocket	18	14	14	14	17 16
4 1/2" crank	4 1/2	4 1/2	5	5 1/2	5 5

35.5 = 43 1/2 gear with 5 1/2 crank

34 1/2

Price 1-

April 1963

39 1/2

52x6 1/2

42.3

A List of

1.779

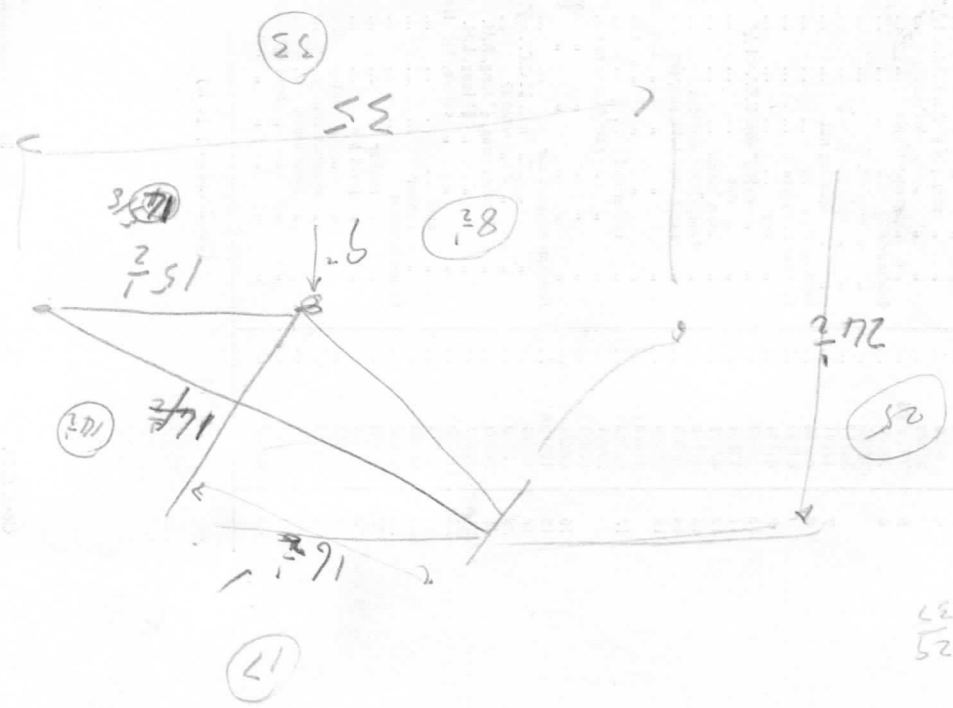
1465

SPARE & REPLACEMENT PARTS

for the

1963

$\frac{19.500}{15.500}$
 35 out
 $15\frac{1}{2}$



$\frac{25}{25}$
 $\frac{37}{37}$

42
 $38\frac{1}{2}$
 35

$16 \times 1\frac{3}{8}$

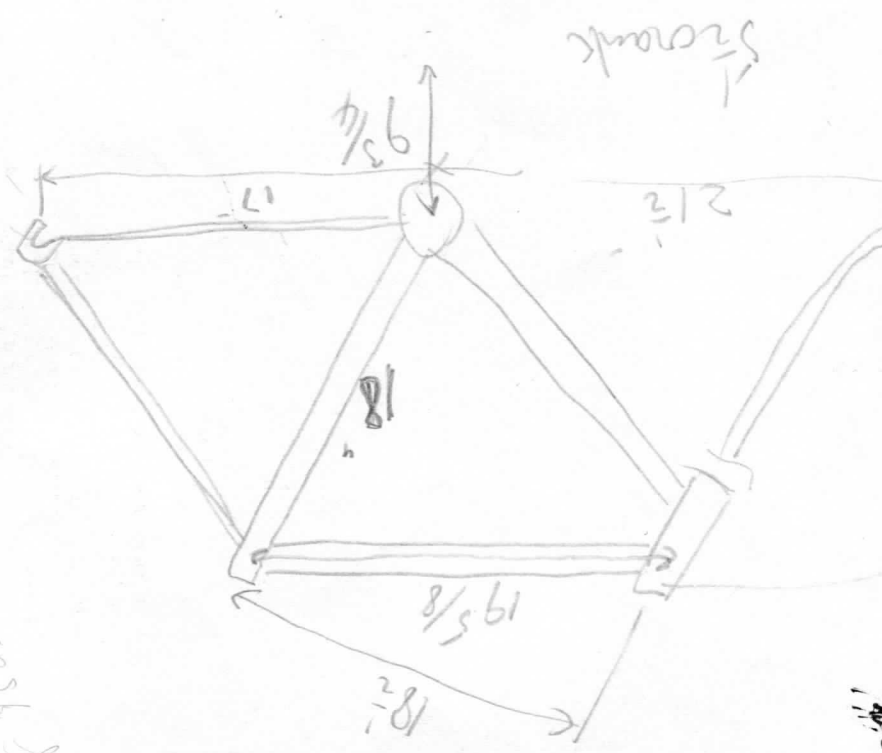
$24 \times 1\frac{3}{8}$ type

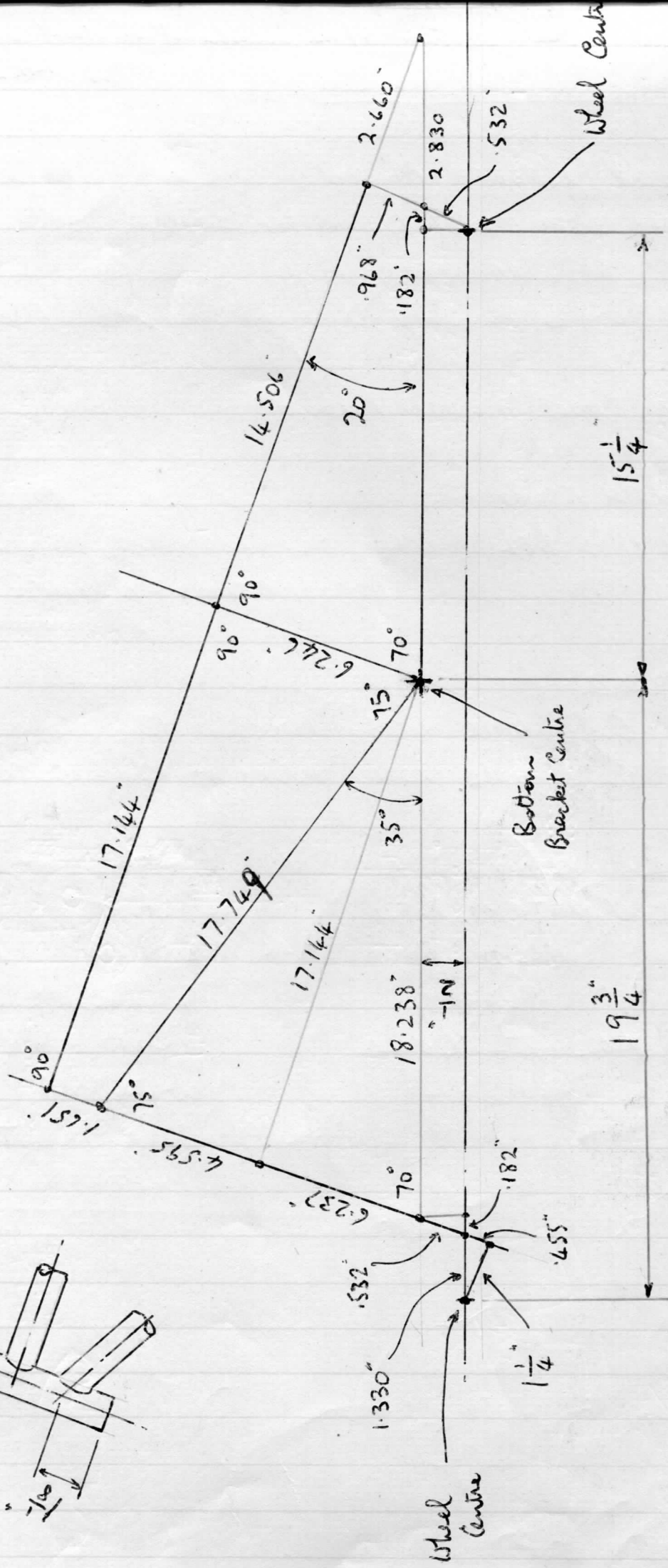
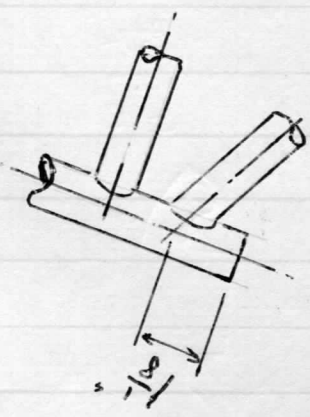
40 down 18 Res

$12^{\#} R$

$2\frac{3}{8}$ roller

900

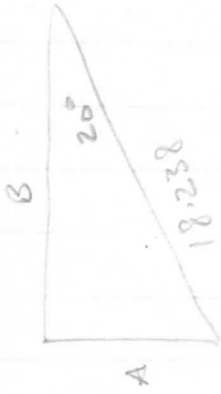




FRAME GEOMETRY

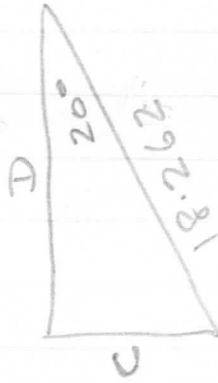
JUNIOR REVELATION

5TH MARCH 1965



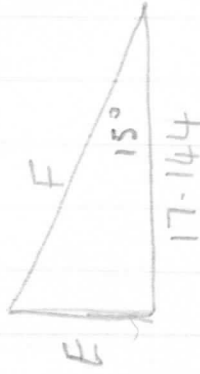
$$\begin{array}{r} 1.330 \\ + .182 \\ \hline 1.512 \\ 19.750 \\ \hline 1.512 \\ \hline 18.238 \end{array}$$

$$A = \text{Sine } 20^\circ \times 18.238 = .342 \times 18.238 = 6.237$$



$$\begin{array}{r} 15.250 \\ + .182 \\ \hline 2.830 \\ 18.262 \end{array}$$

$$C = \text{Sine } 20^\circ \times 18.262 = .342 \times 18.262 = 6.246$$



$$\begin{array}{r} 6.246 \\ + 4.595 \\ \hline 1.651 \end{array}$$

$$E = \text{Tan } 15^\circ \times 17.144 = .268 \times 17.144 = 4.595$$

$$F = \text{Secant } 15^\circ \times 17.144 = 1.035 \times 17.144 = 17.749$$

$$\begin{array}{r} 17.144 \\ + 1.0 \\ \hline 5143 \\ + 857 \\ \hline 17.7440 \\ + .51 \\ \hline 17.7491 \end{array}$$

$$\begin{array}{r} 14.5 \\ + 2.6 \\ \hline 17.1 \\ 15.250 \\ + .182 \\ \hline 2.830 \\ \hline 18.262 \end{array}$$

Police M/ps with 12V equipment fitted wires

OK with normal electrical if no additional electrical equipment
is fitted

16 Sep 1965.

Gear Ratio Calculations.

$$\underline{R = A + BV^2}$$

~~R~~

R = TOTAL RESISTANCE IN LBS

V = SPEED M.P.H.

A = a constant depending on total weight and road conditions and type of tyre (40 lbs/ton for pneumatics on concrete or tar-mac roads) (total weight includes rider)

B = a constant depending on frontal area and degree of streamlining (.014 - .016 for motorcycles, rider prone, no fairing)

$$\underline{\underline{B.H.P. = \frac{1.47 VR}{550}}}$$

Piston Rings

9-3-66

Up to 40,000	ft/sec ²	piston acceleration	- 1/8" wide rings
" " 53,000	"	"	- 3/32 "
" " 80,000	"	"	- 1/16 "
" " 106,000	"	"	- 3/64 "
over 106,000	"	"	- Dykes "

Information from 'Shell'

9-3-66

Combustion Chamber Moulds

SILICONE RUBBER Mould (£1 per lb - 8 lb tin)

SILASET TYPE 105 WITH EITHER -

- 1) 2% HARDENER A
- OR 2) 0.1% HARDENER D + 0.1% TRI-CHLOROETHYLENE

CURING TIME ABOUT 1 HOUR

OBTAINED FROM :-

I.C.I., NOBEL DIVISION, SILICONES DEPT.,
STEVENSTON, Ayrshire

VINAMOULD

50% HMC 1028 } MELTS AT 130-150°C
50% HMC 2036 } POURS AT 120-150°C

OBTAINED FROM :-

~~VINATEX LTD
CARSHALTON
SURREY~~

~~PHONE VICILANT 6044
9/01-669/4543~~

Small Quantities from:-

TOOL DEPOT
ALEC TIRANTI LTD

72 CHARLOTTE ST.

LONDON W1P 2AJ

9/01-636/8565

9/- a lb or 28 lbs + at 7/6 a lb.
Postage on 7 lbs of each grade = 10/-

Information supplied to

1-DEC-1966

Dunlop Rubber Co Ltd

Cycle & Motor Cycle Equipment Division

Fort Dunlop,

Birmingham.

Mr J. R. SAMBROOK, Manager - Cycle & M/C Equipment Sales.

250 Continental G.T. Ft wheel WM1-18 rim, 3.00 x 18 Ribbed Tyre
Rr " WM2-17 rim, 3.25 x 17 lightweight Reinforced
studded

Total Unladen weight 300 lbs

" weight with rider 466 lbs { 187 on Fr
273 on Rr.

750 Interceptors Ft wheel WM2-19 rim, 3.50 x 19 K 70 Studded Tyre
Rr " WM3-18 rim, 4.00 x 18 " " "

Total unladen weight 415 lbs

" weight with rider 594 lbs { 247 on Fr
346 on Rr

HARBARO RUBBER Co.

17-AUG-1967

Tools available for the following:-

W. 41937 Harbaro N° 3728

W. 26193 " 1556

W. 21791 - 2151

W. 28346 " 1555

248 cc CRANKSHAFT BALANCING FOR ENFIELD SPARES
8-12-69

WEIGHTS

Piston (c/w RINGS, G/PIN & CIRCLIPS)	10.917 oz
Big End (c/w LINERS, SCREWS & WASHERS)	9.435 oz
Small End	2.706 oz
Rod - complete	12.141 oz

Reciprocating Weight = $10.917 + 2.706 = 13.623$ oz

75% of 13.623 oz = 10.217 oz
Rotating Weight = 9.435 oz
19.652 oz

= 19 oz 10 drachms

