

Ducati Sport 48 (2 stroke, 3 speed)

Wheelbase $46\frac{1}{2}$ "

Wheel Sizes $2\frac{1}{4} \times 19$, Ribbed front, Block Rear.

Width tank = 10 ", length = $16\frac{1}{2}$ ", max depth = $8\frac{1}{2}$ "

length of seat along top = $18\frac{1}{4}$ " Max width = $7\frac{1}{2}$ "

Width at front = 5 "

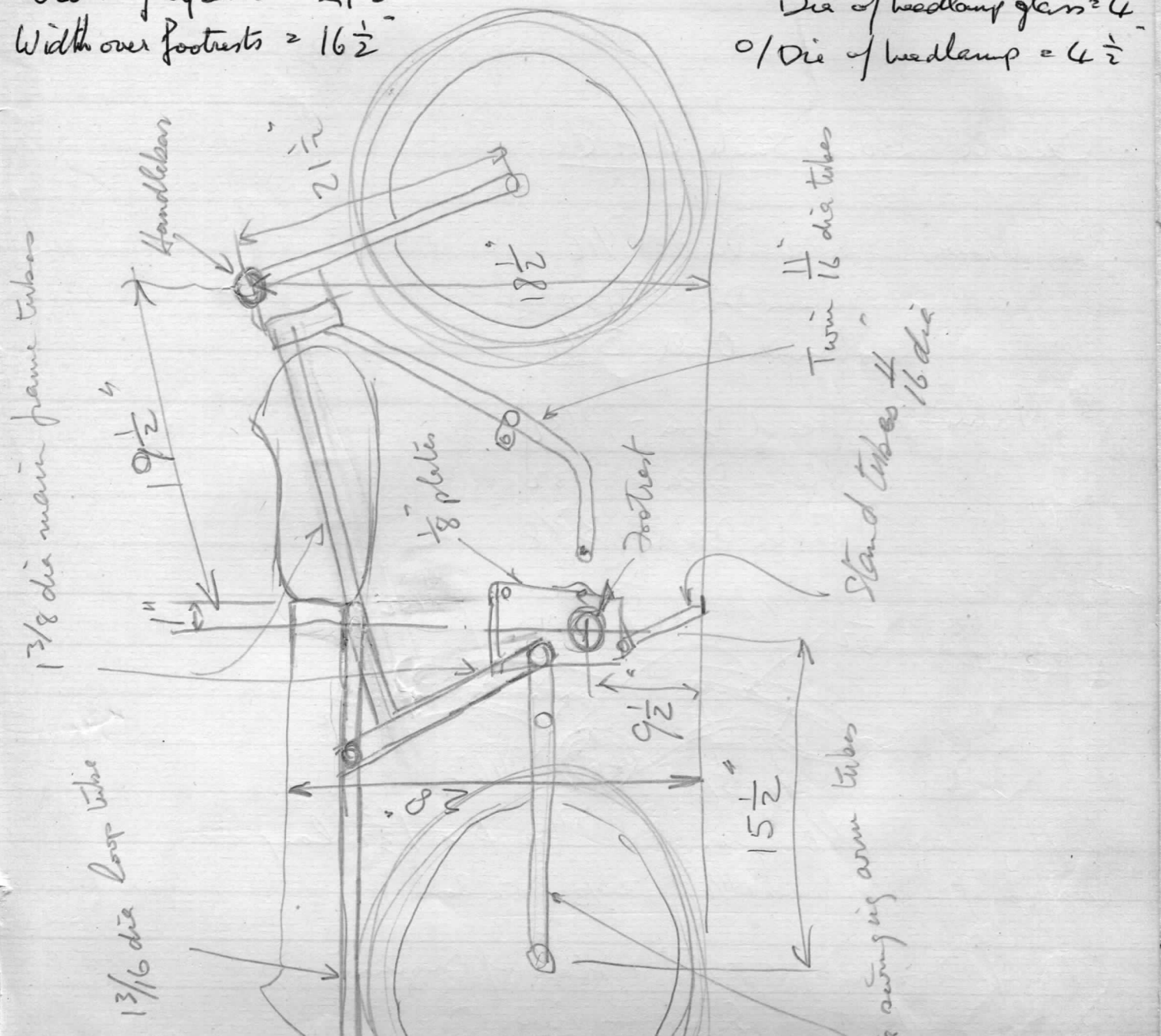
Width at Rear = $5\frac{1}{2}$ "

Width of Wbars = $21\frac{1}{2}$ "

Width over footrests = $16\frac{1}{2}$ "

Dia of headlamp glass = 4 "

O/Die of headlamp = $4\frac{1}{2}$ "



Norton Double Knocker Head

Angle of Downdraught = 24°

" " Offset = 10° in plan view

Dia of Inlet Port at Carb Flange = $1\frac{9}{32}$ "

Dia of Ex Port at Pipe end = $1\frac{5}{8}$ "

Die of In Valve Head = $1\frac{15}{16}$ "

Die of " Stem = $\frac{5}{16}$ "

Die of Ex Valve Head = $1\frac{3}{4}$ "

" " Stem = $1\frac{3}{32}$ (sodium filled?)

Diameter of Gudgeon Pin = 1"

Ducati 200cc Single O.H.C.

In Valve Head Dia = $1\frac{7}{16}$ "

Stem Dia = $\frac{9}{32}$ "

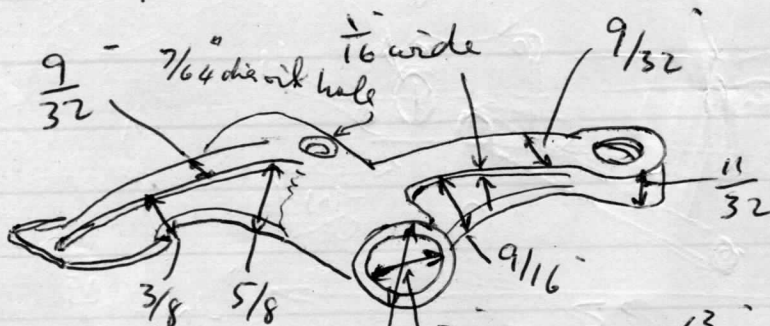
Length O'all = $3\frac{3}{8}$ "

Ex Valve Head Dia = $1\frac{9}{32}$ "

Stem Dia = $\frac{9}{32}$ "

Length O'all = $3\frac{3}{8}$ "

Rockers



Length of arms = $1\frac{5}{8}$ approx

Thickness of centre of arms = $\frac{11}{64}$ " $2\frac{3}{32}$ die Boss.

Angle of Downdraught = 5° + Slope of Engine

" " Offset = 15° in plan view

Die of In Port (Carb Flange) = $1\frac{1}{32}$ "

$\frac{1}{32} + \frac{1}{32} = \frac{2}{32} = \frac{1}{16}$ "

14th January 1963

Valve Timings

Jaguar 3-4 litre

Inlet Opens 15° Before T.D.C.
" Closes 57° After B.D.C.
Exhaust Opens 57° Before B.D.C.
" Closes 15° After T.D.C.

Jaguar 2-4 litre

Inlet Opens 10° Before T.D.C.
" Closes 50° After B.D.C.
Exhaust Opens 57° Before B.D.C.
" Closes 15° After T.D.C.

Norton International (Single Camshaft) Up to 1953

Inlet Opens $47\frac{1}{2}^\circ$ Before T.D.C.
" Closes 70° After B.D.C.
Exhaust Opens 85° Before B.D.C.
" Closes $42\frac{1}{2}^\circ$ After T.D.C.

Norton Maxx (Double Camshaft) Up to 1951

Inlet Opens $57\frac{1}{2}^\circ$ Before T.D.C.
" Closes 60° After B.D.C.
Exhaust Opens 85° Before B.D.C.
" Closes $42\frac{1}{2}^\circ$ After T.D.C.

73
130
1257
126
15
111



118
120
298
149
68
101

7R AJS Cylinder Head

30/1/63

$1\frac{3}{8}$ dia inlet port, carb. end.

16° offset

$11\frac{1}{2}^\circ$ Downdraught

$1\frac{3}{4}$ dia In Valve Head

$1\frac{7}{32}$ dia Ex " "

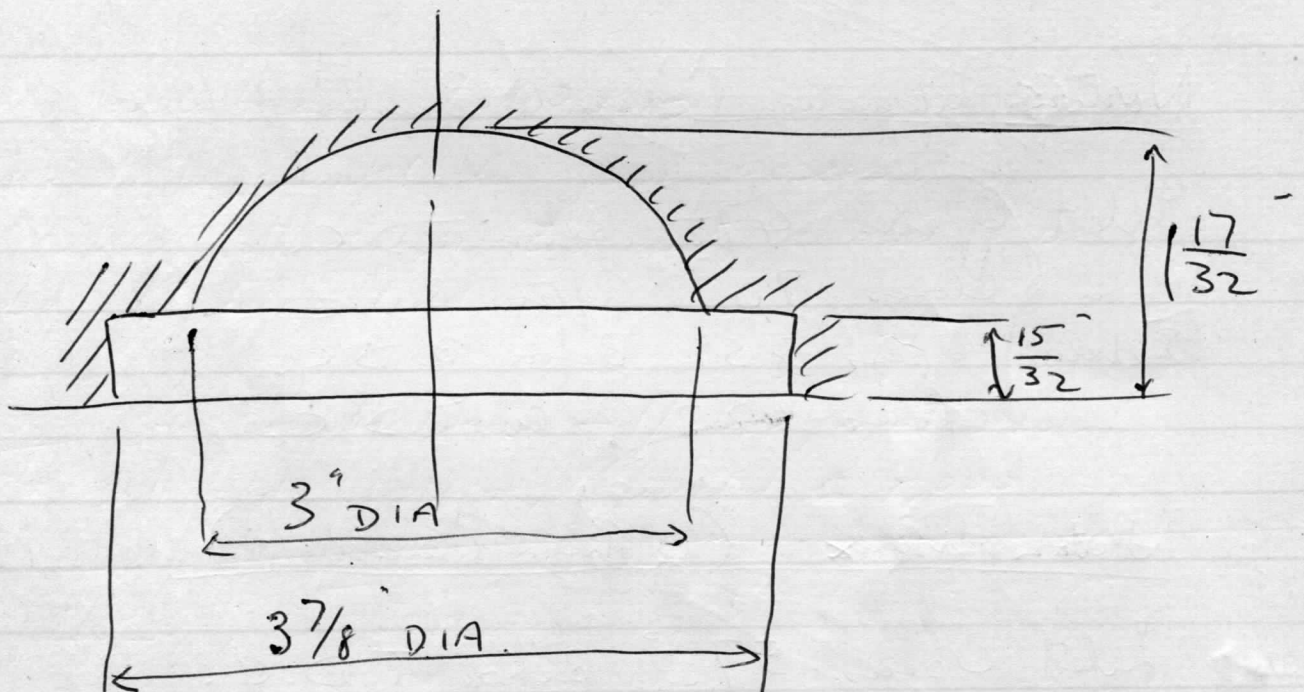
$4\frac{9}{16}$ from ϕ Head to In Flange

$3\frac{5}{8}$ " " " Ex " "

Cam Follower rollers $\frac{3}{4}$ dia \times $\frac{9}{32}$

Roller Pins $\frac{1}{2}$ dia \times $\frac{19}{32}$

Drive end of Crankshaft = $\frac{5}{8}$ dia



7R A.J.S. ~~Value~~ Cam Profile

28/1/63

Degrees of Camshaft movement.

Inlet

102°	.000"	185°	.474"
105°	.004"	190°	.470"
110°	.023"	195°	.457"
115°	.040"	200°	.440"
120°	.068"	205°	.415"
125°	.105"	210°	.385"
130°	.145"	215°	.345"
135°	.195"	220°	.300"
140°	.244"	225°	.252"
145°	.292"	230°	.200"
150°	.340"	235°	.152"
155°	.380"	240°	.109"
160°	.413"	245°	.075"
165°	.439"	250°	.045"
170°	.457"	255°	.024"
175°	.469"	260°	.012"
180°	.474"	265°	.000"

Exhaust

358°	.000"	70°	.391"	145°	.046"
360°	.004"	75°	.400"	150°	.024"
5°	.014"	80°	.403"	155°	.015"
10°	.031"	85°	.400"	160°	.002"
15°	.057"	90°	.393"	163°	.000"
20°	.093"	95°	.381"		
25°	.138"	100°	.365"		
30°	.178"	105°	.348"		
35°	.218"	110°	.322"		
40°	.251"	115°	.293"		
45°	.284"	120°	.258"		
50°	.314"	125°	.220"		
55°	.340"	130°	.185"		

Crusader Sports

Record of Small Dia Stem Valves sent to America

Ex Valve Stem Diameter .2940"
.2935"

In Valve Stem Diameter .2960"
.2955"

Valve Guide Bore .2978"
.2968"

3-4-63 Smiths Speedo & Rev Counter

New Magnetic type

All Speedo Heads 1600 Revs
Ratios to be changed in gear boxes
New cables with longer top nut, cables to be
guided 6" below head.

250s Rev Counter Drive - 1/1 box, ^{same} as at present
2/1 Head, Clockwise, Calibrated to 8,000

3-5-63 Titanium £3 per lb (Twice the weight of Aluminium)

Mr WORTLEY (TECH SALES)
IMPERIAL METAL INDUSTRIES
WITTON
BIRMINGHAM

28th January, 1963.

7/R or G.50 Cams - Degree Plate on Camshaft
Gauge on End of Valve

<u>INLET</u>			
Degree	.0000	Degree	.0000
102	0	200	440
105	4	205	415
110	23	210	385
115	40	215	345
120	68	220	300
125	105	225	252
130	145	230	200
135	195	235	152
140	244	240	109
145	292	245	75
150	340	250	45
155	380	255	24
160	413	260	12
165	439	265	0
170	457		
175	469		
180	474		
185	474		
190	470		
195	457		

<u>EXHAUST</u>			
Degree	.000	Degree	.000
358	0	90	393
360	4	95	381
365	14	100	365
10	31	105	348
15	57	110	322
20	93	115	293
25	138	120	258
30	178	125	220
35	218	130	185
40	251	135	126
45	284	140	81
50	314	145	46
55	340	150	24
60	362	155	15
65	378	160	2
70	391	163	0
75	400		
80	403		
85	400		

NORTON. VALVE TIMING.

TWINS

SINGLES

	88	99	650	ES2	50	
INLET OPENS BEFORE T.D.C.	1/8"	5/32"		5/16"	11/32"	A
INLET CLOSES AFTER B.D.C.	17/32"	5/8"				
EXHAUST OPENS BEFORE B.D.C.	17/32"	5/8"				
EXHAUST CLOSES AFTER T.D.C.	1/8"	5/32"		5/16"	11/32"	
BORE	66 M/M	68 M/M	68 M/M	79 M/M	71 M/M	
STROKE	72.6 M/M	82 M/M	89 M/M	100 M/M	88 M/M	
CAPACITY	490cc	596cc	646cc	490cc	348cc	

MANX NORTONS. (1961)

VALVE TIMING. (LIFT AT T.D.C)

	500	350
INLET	.280"	.300"
EXHAUST	.175"	.152"

VALVE TIMING WITH .045" CLEARANCE.

	500	350
INLET B.T.D.C	48°	55°
EXHAUST A.T.D.C	34°	33°

~~VALVE~~

4/7 each

~~19~~ 20th Sep '63

Scrambler leading-link front fork

2nd Set of Springs.

Min inside Dia 1.01"
 Max outside Dia 1.44"
 Free length 11.5"
 Rate 50 lb/in
 Max Solid height 5.6"
 Min Working length 5.6"
 Matl EN 49BAC

WIRE DIA .200"
 WORKING COILS ~~28~~ 26
 TOTAL COILS ~~30~~ 28
 Max Corrected Stress 127,000 lb/in²

MR BODSEN - AUTO SPRINGS, REDDITCH, 5161.

JAMES MOTOR CYCLES VICTORIA 2211

MR STAN HACKETT - ASSISTANT DESIGNER

(350 Manx Norton - Sudgeon P. & Matl)

20 Sep '63

75 cc Model P. motor weighed 11.2 lb

16th October 1963

AM 9741

Scrambler Leading Link Front Fork

3rd Set of Springs (for 11st Rider instead of 15st Rider)

Min Inside Dia = 1.01"

Ref N° A 0349

Max Outside Dia = 1.42"

Free Length = 11 5/8"

Rate = 40 lb/in

Max Solid Height = 5.57"

Min Working Length = 5.57"

Material = EN 49B or C

Ends Closed & Ground

Wire Dia = .192"

Working Coils = 27

Total Coils = 29

Max Corrected Stress = 128,000 lb/psi

MR BUDSEN - AUTO SPRINGS, REDDITCH, 5161

With the above springs fitted & 11st Rider

Spring Box Centres = 18 3/8" stood on footrests

18 3/4" seated

4T Engine Speeds Ratios

James

$$\frac{52 \times 27 \times 4 \times 849}{18 \times 17 \times 9} = 1731$$

3.25 x 18
lightweight beam wheels

Present Housing Dia = $2.8320'$
 2.8315 dia

Expansion per $^{\circ}\text{C}$ = $.000021''$ per inch (Alum)
 $170^{\circ}\text{F} = 77^{\circ}\text{C} = .0016''$ per inch
 $= .0045''$ on 2.832 dia

$.000013''$ per inch (Steel)

Differential expansion per $^{\circ}\text{C}$ = $.000008''$ per inch

$170^{\circ}\text{F} = 77^{\circ}\text{C} = .000616''$ per inch
 $= .0017''$ on 2.832 dia

SKF 6207 35/72/17 (Ball)

SKF N207 " (Roller)

limits $+0$
 $-.013$ m/in

72 m/in = 2.83465 $+0$ $-.00051$ = 2.83465 $0/D$ Bearing
 2.83414

Present Fit = $.00315''$ Interference
 $.00214''$

Differential Expansion of Ball Track & Housing at $170^{\circ}\text{F} = .0017''$

$9 \times 1.1 + 170^{\circ} = -.00145''$

24th October 1963

248cc OHV MODELS & 346cc CRUSADER MODEL

Kickstart spring distance piece to be shortened to $\frac{3}{16}$ " wide

New shaft drawing to be shortened.

~~Folding~~ Larger type offset Folding Kickstart Crank to be used on all above models including Clipper.

25th October 1963

75cc Model

ENGINE N° S. 75/4 VILLIERS.

FRAME N° 69038

30th October 1963

Alpha 250 2-stroke 66 x 72mm

Flywheel controlled inlet port, total opening 200 degrees.
completely open for 145 degrees.

Inlet port centrally webbed vertically making two ~~ports~~ windows $\frac{3}{4}$ " wide x $1\frac{1}{2}$ " at rear of crankcase

Amel TT Carb at 25 degree angle

H 830 WP

4-11-63

Engine Plates for 250 Scrambler with Stermaker Engine

3/16 thick Hyduminium NS ~~A~~ 1/2 H.
1 piece 24" x 10" makes 2 plates

Hyl. Dets. Alloys Ltd, Rolling Div, Briton Ferry, Neath, Glam.

Our Order No AB 10079

HDA - 33230

Their Works Order No 9604/1

MIDLAND DESIGN & DRAUGHTING CO (REDDITCH) LTD.

LODGE ROAD.

REDDITCH 2343

MR SHEPHERD

14-1-64

GIRLING STD RACING SPRING BOX

Extended Length = $11 \frac{7}{8}$ "

Compressed - = $8 \frac{5}{8}$ "

All Eyes = $3/8$ " DIA x $15/16$ "

10-12-63

GIRLING SPRING BOX "BEARLE TYPE"

1 1/2" stroke 10" Extended Cms
8 1/2" Compressed.
285 lb/in.

11-12-63

Automotive Products
Purolator Div.
Tachbrook Road.
Leamington Spa.

For the attention of Mr. Mole

LEAMINGTON SPA 27000

Order N° AM 10050

12 off Panel Airfilter Type MF 405

TECHNICAL SALES DEPT (PUROLATOR DIV)

MR. E. MOGGS-WRIGHT.

MR. LIAS

Block 12 Filter Division

FENNER BELTS

BROADWELL 2078

MR. MARKS

CREEVES SPECIAL (SPRINT MODEL?)

20TH JAN 1964

WHEELBASE 51"

ENGINE CENTRE TO FRONT WHEEL SPINDLE 23"

LENGTH OF SWINGING ARM 17"

FOOTRESTS 9 1/2" FORWARD OF REAR WHEEL SPINDLE

GROUND CLEARANCE { 6 1/2" AT FOOTCHANCE LINK
6" AT SILENCER

HEIGHT OF FOOTRESTS 13"

ANGLE OF LEAN = 60° PER SIDE

HEIGHT OF ENGINE CENTRE = 12 1/2"

HEAD ANGLE = 63°

TRAIL = 2 1/2" (? ESTIMATED)

HEIGHT TO CENTRE OF TOP HEAD BEARING RACE = 34"

DISTANCE BETWEEN FORK CROWN & BALL HEAD CLIP PLATES = 7 3/8"

SEAT HEIGHT = 28" FRONT, 29 1/2" REAR.

HEIGHT OF SWINGING ARM PIVOT CENTRE = 13 1/4"

DISTANCE FROM STEERING STEM CENTRE
TO BACK OF SEAT →

REAR OF TANK 4 1/2" ABOVE FRONT OF SEAT

WIDTH OF TANK AT REAR = 6"

WIDTH OVER HANDLEBARS = 22"

" " FOOTRESTS = 18 1/2"

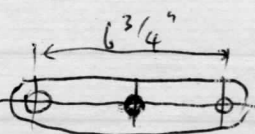
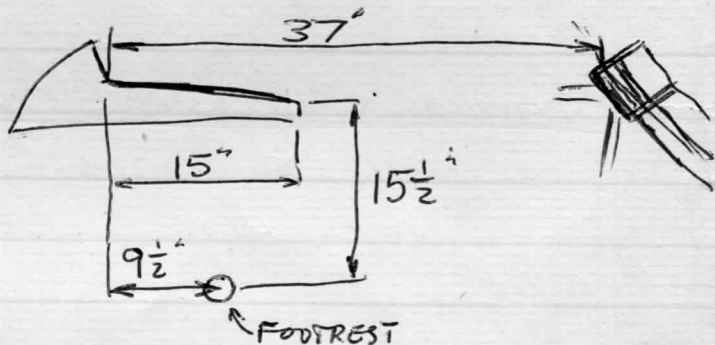
FT FORK STANCHIONS = 6 3/4" CRS. →

DIA " " = 1 3/4"

REAR CHAINLINE = 3"

BRAKES = 6" DIA X 1" WIDE FRONT & REAR

AVON RACING TYRES { 2.75 X 18 FRONT
3.00 X 18 REAR

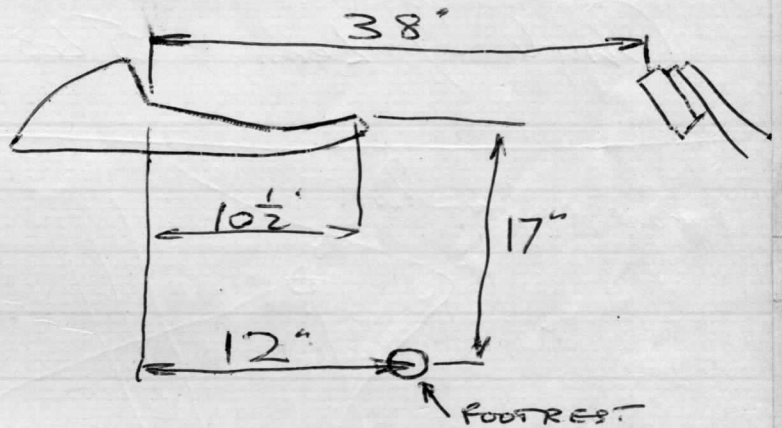


AJS 7R 350cc

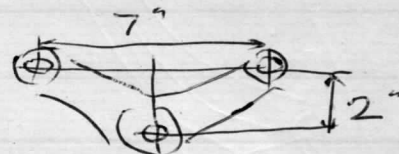
20th JAN 1964

WHEELBASE $54\frac{3}{4}$ "
ENGINE CENTRE TO FRONT WHEEL SPINDLE $23\frac{1}{2}$ "
LENGTH OF SWINGING ARM $15\frac{3}{4}$ "
FOOTRESTS $15\frac{1}{4}$ " FORWARD OF REAR WHEEL SPINDLE
GROUND CLEARANCE $\left\{ \begin{array}{l} 6" \text{ UNDER SUMP} \\ 7" \text{ UNDER FRAME} \end{array} \right.$
HEIGHT OF FOOTRESTS $12\frac{1}{2}$ "
ANGLE OF LEAN = 56° PER SIDE
HEIGHT OF ENGINE CENTRE = $11\frac{1}{2}$ "
HEAD ANGLE = 63°
TRAIL = 4 " (? ESTIMATED)
HEIGHT TO TOP OF FORK CROWN = 36 "
LENGTH OF FRAME HEAD TUBE = $5\frac{3}{4}$ "
SEAT HEIGHT = 30 "
HEIGHT OF SWINGING ARM PIVOT CENTRE = 13 "

DISTANCE FROM STEERING STEM
CENTRE TO BACK OF SEAT \rightarrow



WIDTH OVER HANDLEBARS = 20 "
" " FOOTRESTS = 19 "
FT FORK STANCHIONS = 7 " CRS \rightarrow

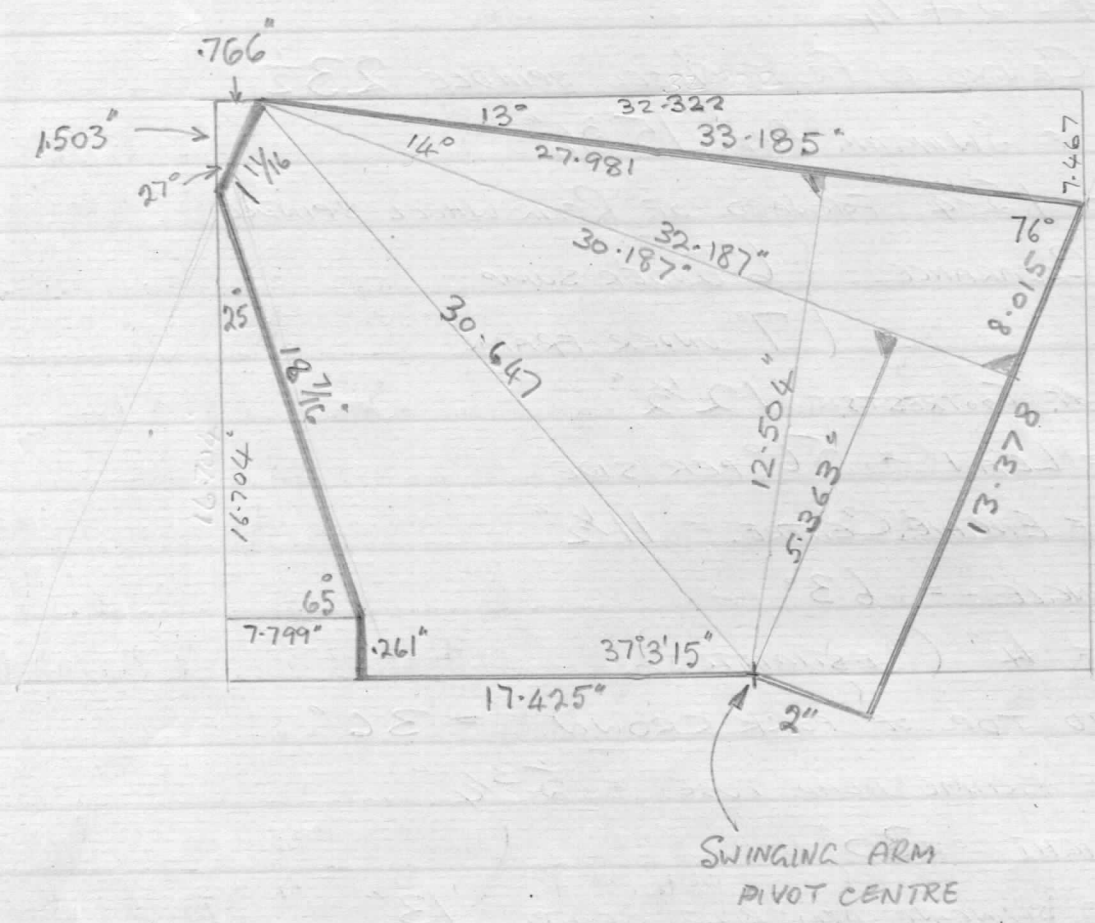


BRAKES 8 " DIA TWIN LEADING SHOE AT FRONT

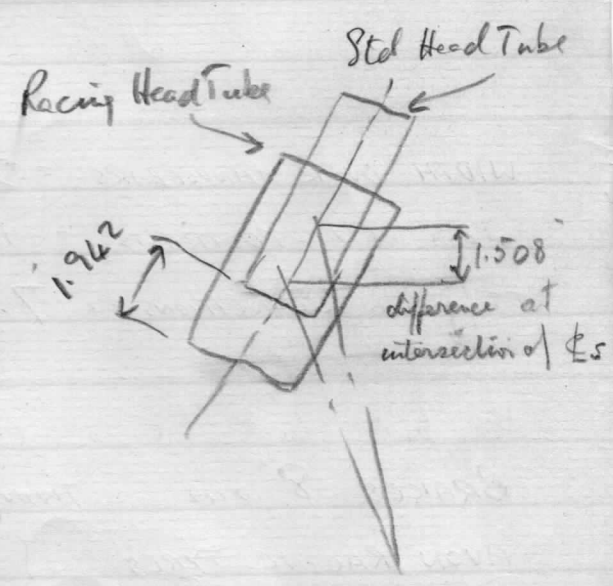
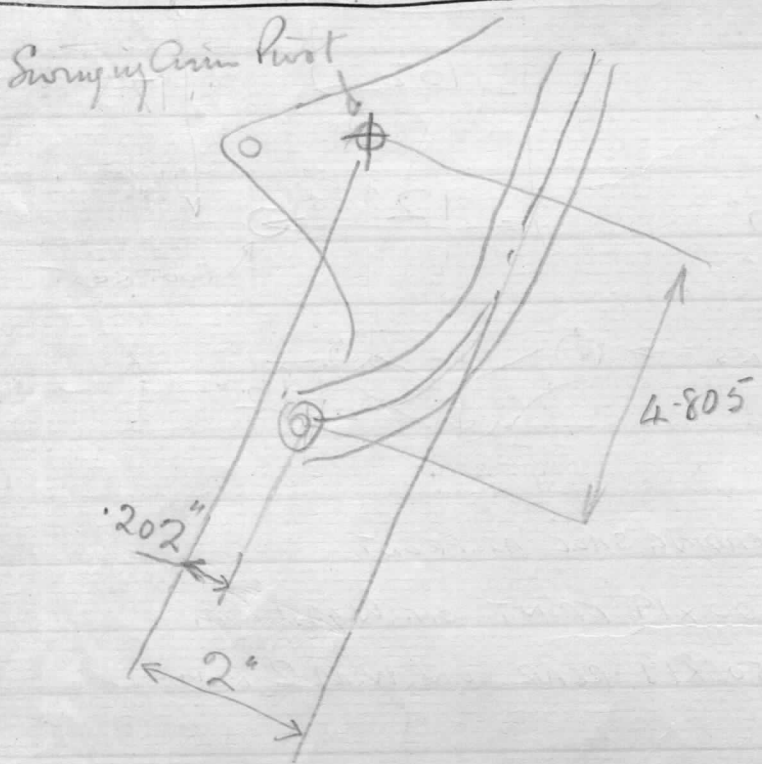
AVON RACING TYRES $\left\{ \begin{array}{l} 3.00 \times 19 \text{ FRONT ON W.M.1 RIM} \\ 3.50 \times 19 \text{ REAR ON W.M.2 RIM} \end{array} \right.$

250 cc Racing Frame

24-1-64



Angle of Lean = 54° per side



Feb 3rd

CIRLING RACING SPRING BOXES

Fitted with 75 Y 80 (75 lbs Rate
Y 1/2 Coding - YELLOW YELLOW & fitted built)
= 40 lb pre-load.

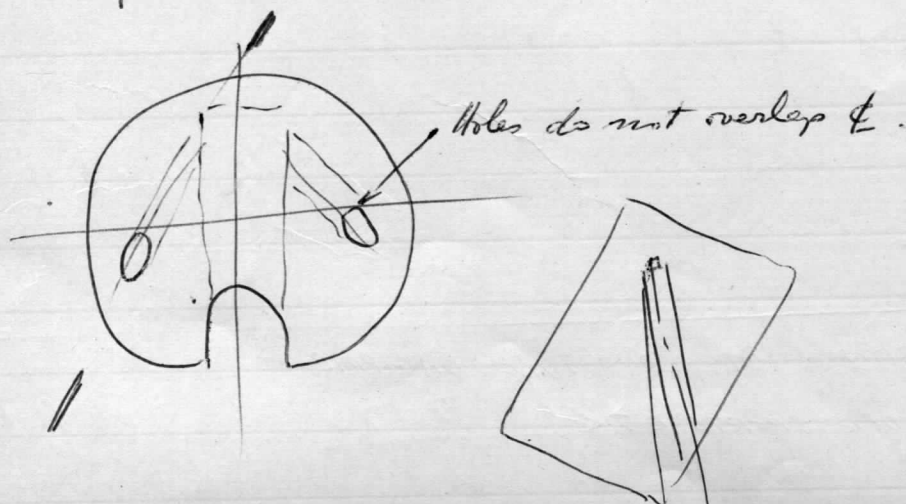
Spare Springs = 90 G Y 80 (= 27 lb pre-load)

Area of Building Land including Playing Field
= 35,000 sq yds.

Area of Building Land including allotments
= 19,830 sq yds

Old Pump Disc 43716 (9552m)

Experimental Modification first submitted to U.S.A.



28-2-64

1st 250 Racing Machine

Special Star-Maker Engine.

Gear Ratios

Engine Sprocket	20 T		
Clutch	43 T		
C/Shaft	18 T		
Rear Wheel Sprocket	42 T	=	5.02 Top Gear
	43 T	=	5.14
	44 T	=	5.26
	45 T	=	5.38
	46 T	=	5.50
	<u>47 T</u>	=	<u>5.62</u>
	48 T	=	5.73
	49 T	=	5.85
	50 T	=	5.98

CABLES WITH NYLON LINING

F.D. WICKS & Co.

SHERRARDS GREEN ROAD.

MALVERN.

MALVERN 1814

GIRLING REAR SUSPENSION WITH MONO-TUBE DAMPING
EXA TO REPLACE CRUSADER SPORTS ETC.

320 x 395 SUSPENSION UNIT W.41568

HONDA 50 Open Frame

27/3/64

WHEELBASE 47"

HEAD ANGLE 26°

GROUND CLEARANCE 5½"

TYRES 21" x 2.25"

SEAT HEIGHT 27" (LADEN ~~160 lb~~)

GROUND TO OPEN FRAME APERTURE (" ") = 18"

HANDLEBAR HEIGHT 36" (" ")

" WIDTH 22½"

LEG SHIELD, TOP WIDTH 13"

" MAX " 16"

HEADLAMP DIA = 4"

SPRINGBOX CRS = 9¾" EXTENDED

DUAL SEAT LENGTH 24½"

" WIDTH 8½"

PETROL TANK CAPACITY 5½ pts (THIS IS OHV ENGINE!)

MAIN TUBE DIA = 1⅞"

GROUND TO CENTRE OF FOOTREST = 8½" (LADEN ~~160 lb~~)

" " " H'BAR GRIPS = 36" (" ")

NOSE OF SADDLE IS 11" BACK FROM H'BAR GRIPS.

FOOTREST UNDER NOSE OF SADDLE, OR FOOTREST SLIGHTLY BACK.

WIDTH ACROSS FOOTRESTS = 20"

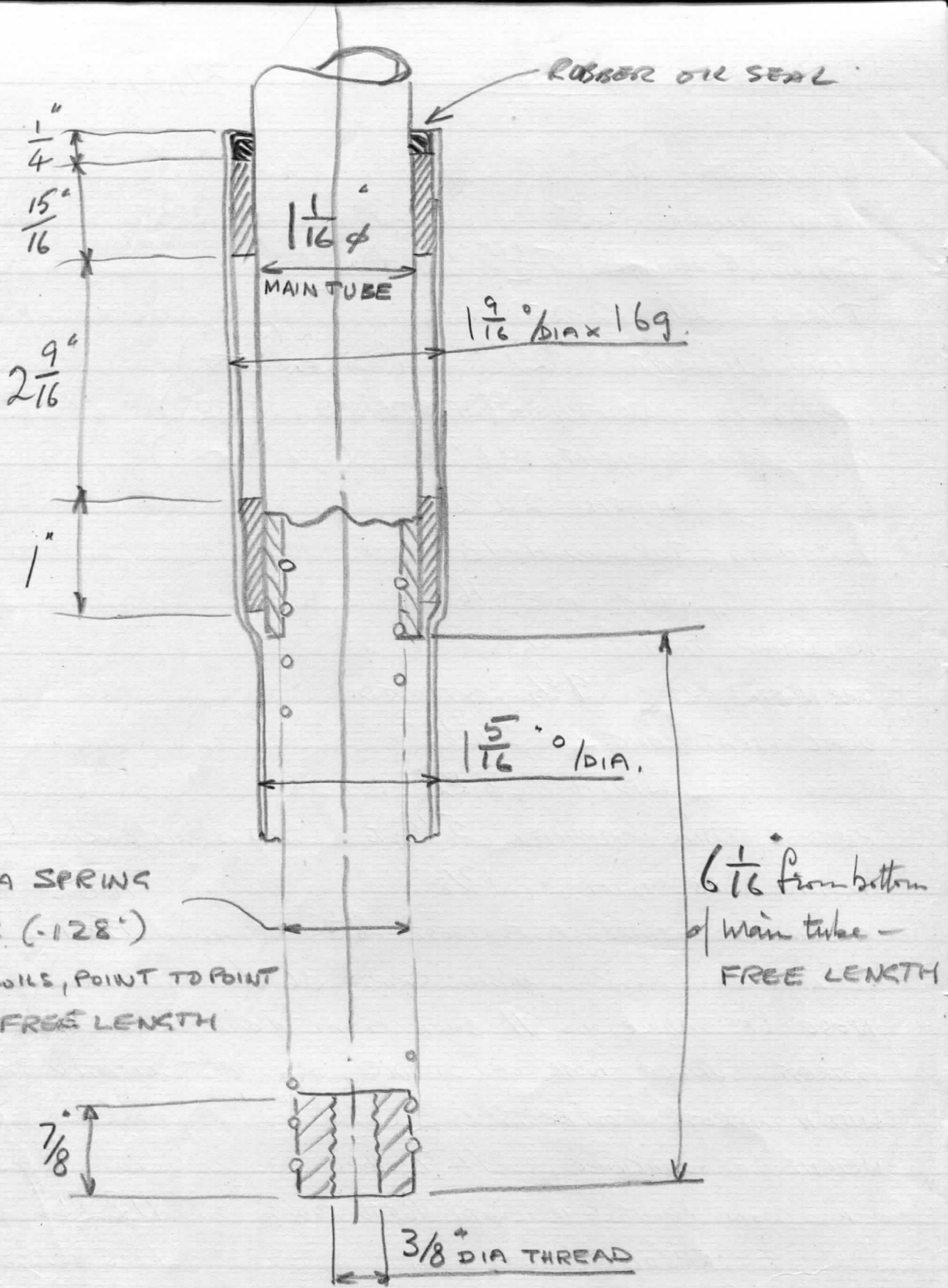
WEIGHT OF MACHINE 147 lbs.

" ON FRONT WHEEL WITH 160 lb RIDER = 118 lbs

" REAR " " " = 186 lbs

ITALIAN FORKS (NOT ENAMELLED)

Length of Forks from wheel spindle to face for bottom Head Bearing
= 16⅞" with forks loaded 118 lbs at 27° head angle



ITALIAN FRONT FORKS

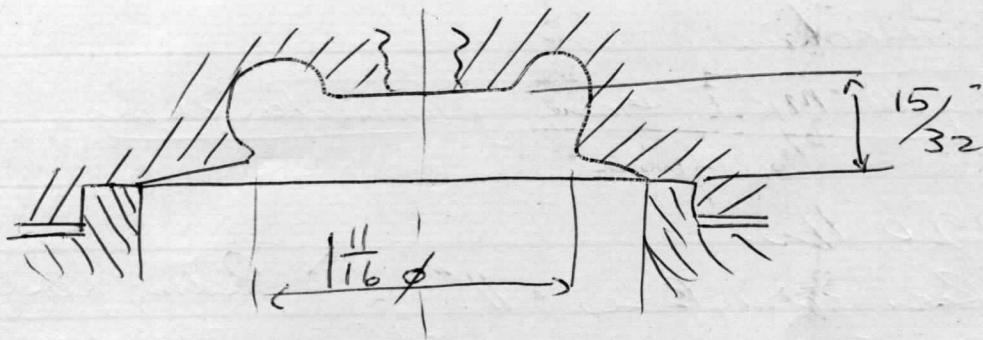
2/4/64

9/4/64 I.C.I. Ltd. 50 Great Charles St. Birmingham 3
 CENTRAL 7070

MR WYBOURN, LEATHERCLOTH DIV.

VULKIDE "A" RIGID A.B.S. SHEET .060 GREY 18" x 18"

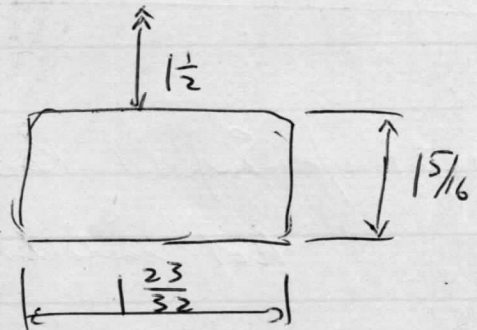
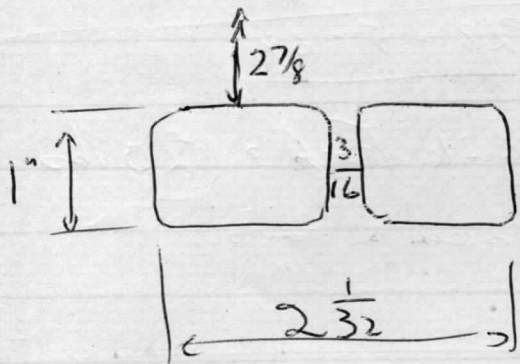
Starnaker 8-5-64



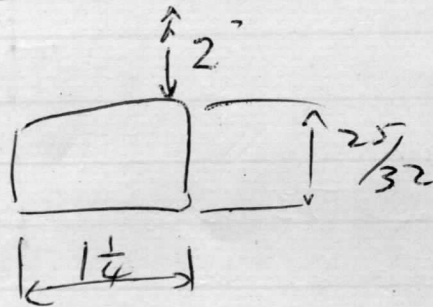
Piston $1 \frac{13}{32}$ above φ pin + $\frac{5}{32}$ dome.

$2 \frac{7}{8}$ overall length, $\frac{3}{16}$ shorter at rear.

$1 \frac{3}{8}$ wide cut-away.



Inlet



TRANSFER

Springs supplied by "Terrys" for Gisting/Reynolds
Leading Link Fork for 250 Recor

ORDER N° AM 10597

Dated 17/Mar/64

1.76" φ wire

15-6 Total Coils RH

13-6 Active Coils

1.015/1.030 Inside Dia

$5 \frac{3}{32}$ Free length.

59 lbs Rate

27 May 1964

250 cc TT machine

Enfield MK I Frame Stermoker Engine

Weight 220 lbs.

Length of Rear Spring Boxes = 11" } Riding level but
" " Front " " = 16 5/16" } 3/8" high

John Rafferty up.

28-5-64

Weight of Enfield Racing Leading-Link Fork = 20 lbs
not including steering stem & nuts

4-9-64

80cc Enfield with Sports Body:

Weight of Machine = 154 lbs

Weight on Front Wheel, unladen = 73 lbs

" " Rear " " = 81 lbs

" " Front " with 142 lb rider = 108 lbs

" " Rear " " " = 172 lbs

" " " " " " & 190 lb passenger = 364 lbs

" " " " " " 190 lb rider = 217 lbs

" " " " " " & 142 lb passenger = 359 lbs

" " Front " " " = 127 lbs