

where

N = R.P.M.

l = length of stroke

n = ratio of con. rod to stroke

$$v = \frac{\pi l N}{720} \left(\sin \theta + \frac{1}{2n} (\sin \theta \cdot \cos \theta) \right)$$

feet per sec.

O.K.

5/16/17. 10.23

see 54. page for acceleration
& inertia forces etc.

Oil Pump for 12 HP Engine
72, 1/4" x 4" stroke.

dia of crankshaft = 1 1/2" dia.

5 bearings 4 + 5/8" = 3 1/2"

Projected area = 9 5/8" x 1 1/2" = 14 1/2 sq"

Projected area of con. rod big.
= 1 5/8" x 4 x 1 1/2 = 9 3/4 sq"

Quantity of oil delivered per min
= $\frac{2\pi d f n}{p} = \frac{2 \times 3.14 \times \frac{7}{8} \times \frac{7}{8}}{16}$

= 150 cu. in per min.

say 10 cu. in per square in
of main big. surface
@ 1000 R.P.M (crankshaft)

(d = pitch dia. of gear
 f = face width of gear
 n = no. of teeth
 p = diametral pitch)

Crankshaft for 10 HP Engine
 72 mm Bore x 4" stroke

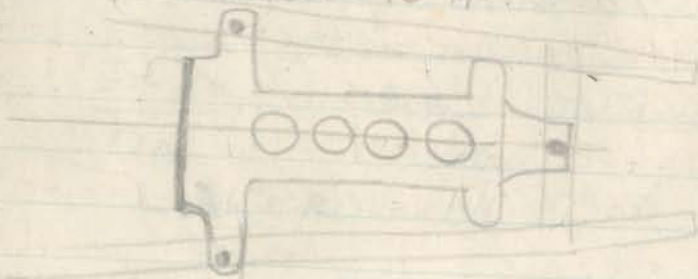
400 lbs per sq" max explosion pressure.

= 2500 lbs. on pistons

= $\frac{2500}{1\frac{5}{8} \times 1\frac{1}{2}}$ = 1000 lbs per square inch on crankpin.

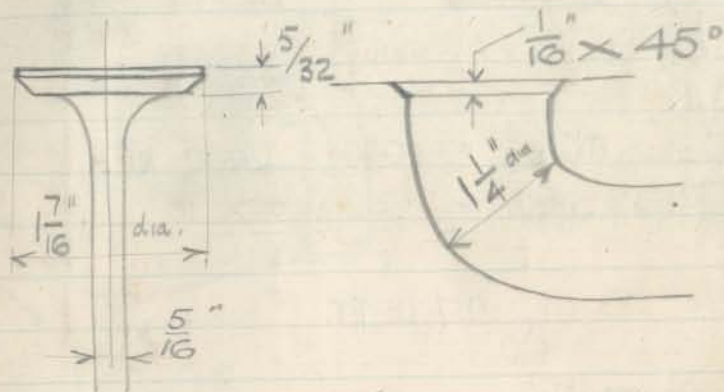
500 lbs per square in on main brgs. 1, 2, 3 & 4 Brg. 5?

3 point engine suspension
 P2, P3 and 10 HP.



wt. of magnetos. Four cyl.

Fellows - ES. 4	13 3/4 LBS.
Watford - TYPE E0.4	12 1/2 LBS.
B.L.P.C. - Z.U.4	16 LBS.



Mean dia. when fully open = 1.28"

Area = 1.25 sq" approx

dia. of inlet pipe = 1 1/8"

Area = 1.0 sq" approx

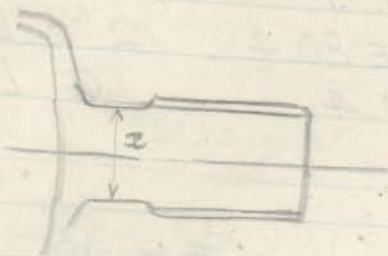
Valve area = 1 1/4"

inlet pipe do

Compression ratio. 4.9 to 1.

12 HP Valves etc.

7 HP Clutch disc centre



HP Transmitted = 10 @ 2000 RPM
 TORQUE = $\frac{33,000 \times 10}{2 \times \pi \times 2000}$

Stays 27 LB. FT.

$S = \frac{T}{\pi} = \frac{324 \times 16}{\pi \times d^3}$

$d = \frac{41}{64} \quad S = 6500 \text{ LBS. per } \square''$

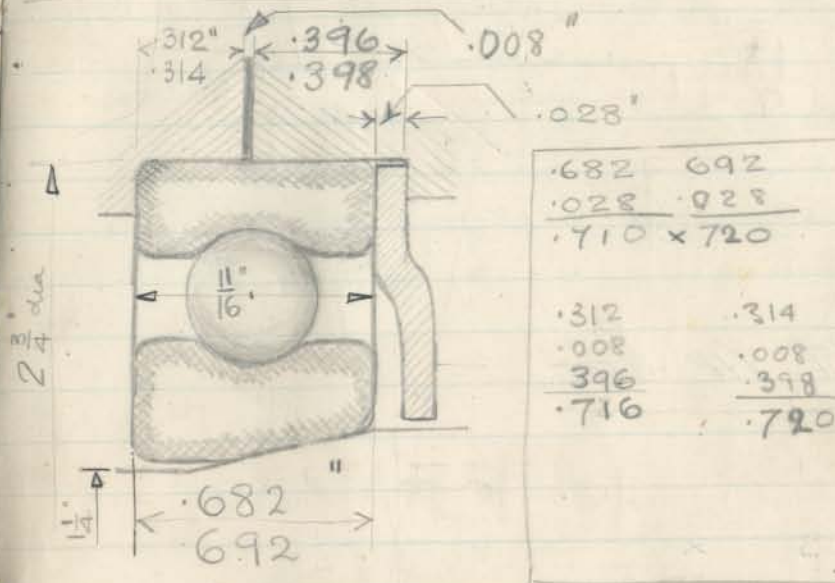
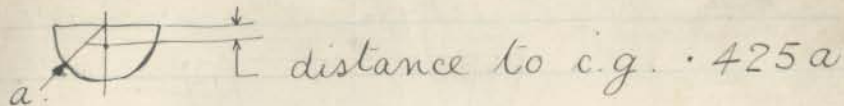
Rear Axle shafts with 10-54 reduction

Bottom gear = 17.6

Reverse = 23.4

with $\frac{7}{8}$ " dia shaft $S = \frac{324 \times 23.4}{2 \times 1315 \cdot (2)}$

= 28,700 LBS. per \square'' approx



Total floating clearance to be
 .004" T. to .010" S.

Enclosed .710" - .720"
 Enclosing .716" - .720"

7 HP Hub Brg. (front & rear)

SPIRAL BEVEL WHEEL & PINIONRATIO. 4.5 TO 1

12 & 54 TEETH. — 8 PITCH

PINION

$$\text{PITCH DIA.} = \frac{12}{8} = 1.500''$$

$$\text{PITCH L (TAN)} = \frac{12}{54} = 12^{\circ} 31''$$

$$\text{CONE DISTANCE} = \sqrt{3/4^2 + 3^2} = 3.457''$$

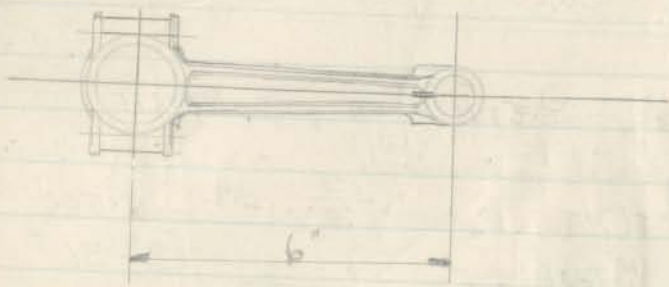
$$\text{FACE ANGLE} =$$

1st YP Car.WHEEL

$$\text{PITCH DIA.} = \frac{54}{8} = 6.750''$$

$$\text{PITCH L} = 77^{\circ} 29''$$

FACE ANGLE

Connecting rods.

7 HP Particulars etc.

Engine 2.2" x 3" x 4" (56 x 76)

Aluminum pistons weight 4 ozs. 2 rings at top
 1 scraper in skirt. $\frac{3}{8}$ " above gudgeon $\frac{1}{4}$ " below
 Gudgeon pin $\frac{1}{2}$ " dia. (hollow)

Crankshaft 18. Big end $1\frac{1}{8}$ x $1\frac{1}{2}$ " (long)

2 main roller logs $1\frac{1}{2}$ x $2\frac{1}{16}$ x $\frac{1}{16}$ " (stiffen)

1 journal ball brg. used a thrust brg. dimensions do.

Crank webs $\frac{1}{16}$ x $1\frac{1}{2}$ " (ends) $\frac{13}{16}$ x $\frac{1}{2}$ " (center) (rough stamp)

Crank pins drilled $\frac{3}{8}$ " dia. Crankshaft gear
 $\frac{5}{8}$ " wide do. camshaft. mag. intermediate $\frac{1}{2}$ "
 gear C.I. helical teeth 45 spiral angle 10 DP.

15 T. crankshaft | 30 T. camshaft

15 T. mag. intermediate

12 T. diprons (this latter driven as spiral
 wheel of camshaft wheel)

Conn. rod bolts No. B.S.F. (2 on each)

Camshaft $\frac{5}{8}$ " dia. front bearing $\frac{3}{4}$ " dia. x $1\frac{7}{16}$ "
 rear 1 " x $\frac{5}{8}$ ". middle roller $\frac{7}{16}$ " dia. on $\frac{5}{8}$ " shaft
 base circle of cam $\frac{3}{4}$ " dia. lift $\frac{1}{4}$ ". Tappet
 end radius $\frac{3}{8}$ ". dia. of tappet plunger $\frac{1}{2}$ ".
 bearing length $1\frac{3}{8}$ ". tappet screw $\frac{7}{8}$ " B.S.F.

Valve stem $\frac{9}{32}$ ". head dia. $1\frac{1}{32}$ " x 45° x $\frac{3}{32}$ "

Valve throat dia. $\frac{15}{16}$ ". Exhaust port $\frac{15}{16}$ x $\frac{7}{8}$ ". Inlet
 $1\frac{1}{8}$ x $\frac{7}{8}$ ". O.D. of cylinders $2\frac{1}{2}$ ". Cyl. base studs $\frac{5}{16}$ "

8 off. Cyl. head do. 14 off.