

April 6, 1983

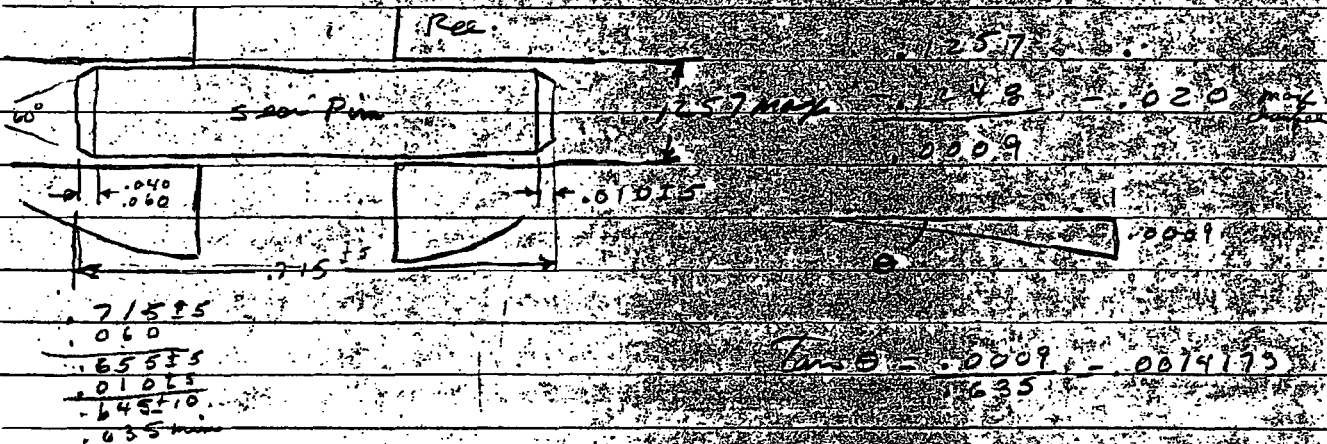
TO: C.B. WORKMAN
FROM: J.W. BROOKS
SUBJECT: MODEL SEVEN LIGHTWEIGHT

The attached information pages 1 thru 15 show the calculations made using model drawing dimensions, to find the amount of clearance between the altered trigger and the trigger guard plate in the worst condition. Page 6 shows a worst condition clearance of .010 when the trigger is cocked to one side. The figures used are maximum and minimum dimensions of parts and does not allow for a crooked hole.

Page 9 and 10 shows that with maximum offset of the present trigger, trigger guard plate and stock plus a maximum cocking condition of the trigger it will interfere with the trigger guard plate by .0035. When the trigger is altered (Page 12) there is an additional clearance of .0137 which leaves a total of .0101 clearance. However, if the trigger is not cocked to the side but is centered we would have the above .0101 + .008 (Page 6) or a total of .0181 clearance.

This does not take into consideration the twisting of the Receiver in the stock before the screws are tight. If this happens the trigger can be cocked .0165 (Page 15) just by twisting action of the Receiver in the Stock. This means that .0181 - .0165 leaves a clearance of .0016. This means the trigger can be cocked and made to touch the trigger guard plate if the Receiver is twisted in the Stock and the trigger is cocked to the same side.

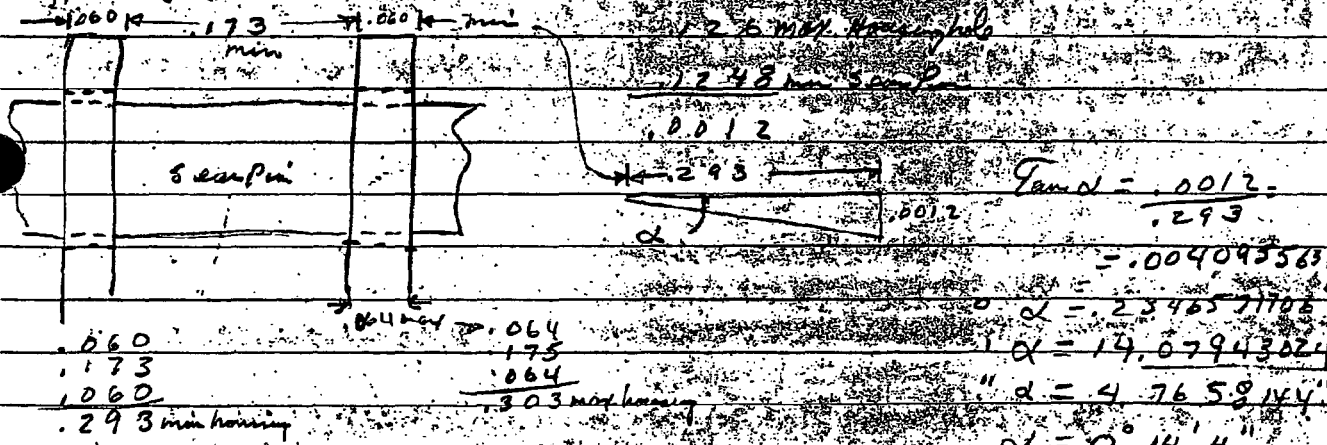
Seam Pin Dia 1248 mm, Length 710 mm
 Receiving seam pin hole 1257 max.



$$\tan \theta = \frac{.0009}{.635} = .0014175$$

$$\theta = 0^{\circ} 4' 52''$$

Housing Seam Pin Hole 126 max.



$$\tan \alpha = \frac{.0012}{.293} = .0040955631$$

$$\alpha = .2346571706^{\circ}$$

$$1 \alpha = 14.07943024''$$

$$'' \alpha = 4.7658144''$$

$$\alpha = 0^{\circ} 14' 4''$$

Maximum amount of taper by housing with min width & max taper pin holes & rec with max seam pin hole & seam pin of min dia & length is

$$0^{\circ} 14' 4''$$

$$0^{\circ} 4' 52''$$

$$0^{\circ} 18' 56''$$

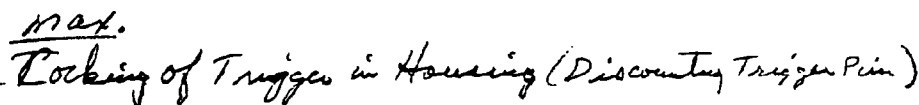


- ① Housing opening in Reservoir = 312 mm max effect continuity + .002
- ② Housing width = 293 mm max
3. " " " " = 303 mm max
4. Seal pin hole in res. from CL = 522 mm max
5. Bottom of res. to 1/2 inch = 658 mm
- ⑥ Seal pin hole to top of Housing = 155 mm

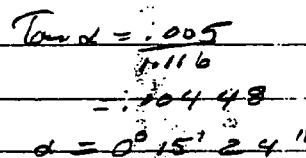
$$\begin{aligned}
 A &= .658 \text{ mm} \quad .312 = \textcircled{1} \\
 & .522 \text{ mm} \quad .293 = \textcircled{2} \\
 & .136 = B \text{ mm} \quad .019 \text{ max clearance between} \\
 & .155 = \textcircled{6} \quad \text{Housing + Reservoir} \\
 C &= .291
 \end{aligned}$$

$$\begin{aligned}
 \tan \alpha &= .019 = .005292 \\
 & .291 \quad .73659157 \\
 & \quad .13954762 \\
 \alpha &= 30.44' 8'' \text{ max tip of} \\
 & \quad .019 = \text{Housing in Res.}
 \end{aligned}$$

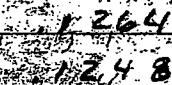
Even if Housing is max width the movement of housing could still be over 30°
 ∴ The seal pin is the control for movement of Housing in res.



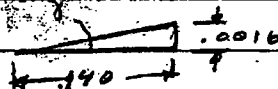
1.1.1 to min amount of trigger is Howering
to give max amount of cocking.



Max cocking of trigger on Trigger Pin



.170
.030 max. 2 sides of trig ge.
.140 min trig on basally
surface.



$$T_{\text{max}} = \frac{.0016}{.140} = .0011428$$

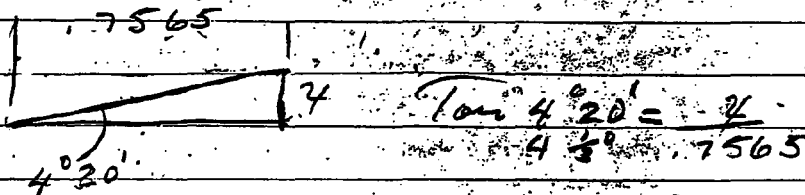
$$\delta = 0^{\circ} 39' 17''$$

Control

∴ The limiting cocking of the trigger in the housing is the trigger & housing and not the trigger pin & hole.

Stock Case section dim at Rear 5th Pin hole

From Receiver Point - (Earl Pin hole) is .7565 ± 9.5
ahead of rear guard screw hole.



Z in Bottom of Stock

$$\begin{aligned} Z &= \tan 4^{\circ} 20' \times .7565 \\ &= .075875 \times .7565 \\ &= .0573241 \end{aligned}$$

Cl. Rec. thru rear guard screw hole to bottom of stock 2.3445 ± 1.6
(From Print) (Page 7)

.0573

2.1872

2.1972 max.

5.885 ± 3

4.6055 ± 2.5

1.905 ± 3

1.428 ± 1

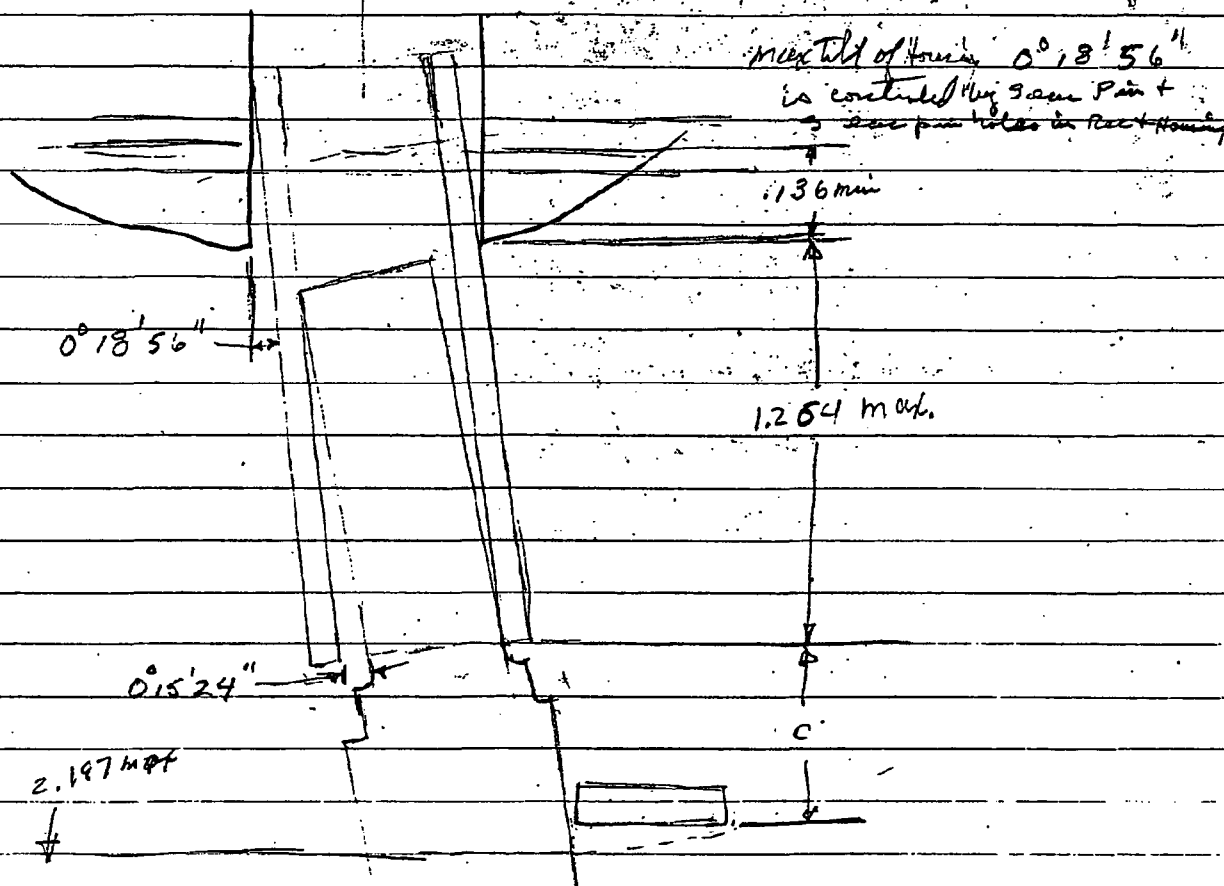
6.790 ± 6

6.0335 ± 3.5

6.0335 ± 3.5

.7565 ± 9.5

distance thru rear
rear pin hole from cl
receiver to bottom of stock.



7. 3 sec pin hole to Bottom of Housing 1.400 max (Page 3)

B = Bottom of receiver to 1/2 sec pin hole 1.36 min (Page 3)

Bottom of receiver to Bottom of Housing 1.264 max

8. C1 studs to bottom of studs (these 3 sec pin holes) 2.197 max (See Page 4)

9. Inset for Trigger Guard Plate (min) - .083

10. Trigger guard Plate (max) + .052

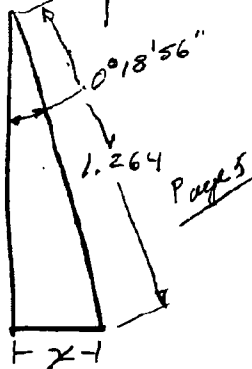
A C1 sec to bottom of rec (Page 2) (min) - .652

1.508

1.264 min

C = Bottom of Housing to Bottom of Trigger Guard Plate 2.414 max

Housing coils in rec max.



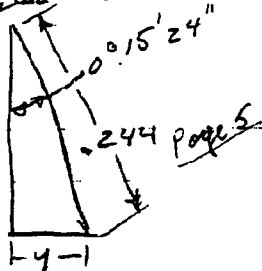
$$\sin 0^{\circ}18'56'' = \frac{x}{1.264}$$

$$x = \sin 0^{\circ}18'56'' (1.264)$$

$$x = .00550 (1.264) = 0.006952$$

=

Trigger coils in housing max. (at bottom of T.G.P.)



$$\sin 0^{\circ}15'24'' = \frac{y}{.244}$$

$$y = \sin 0^{\circ}15'24'' (.244)$$

$$= .00448 (.244) = .00109$$

=

Max. offset of trigger when cocked to one side.

Housing slot in rec can be offset

± .002

Housing coils in rec (max) (see above)

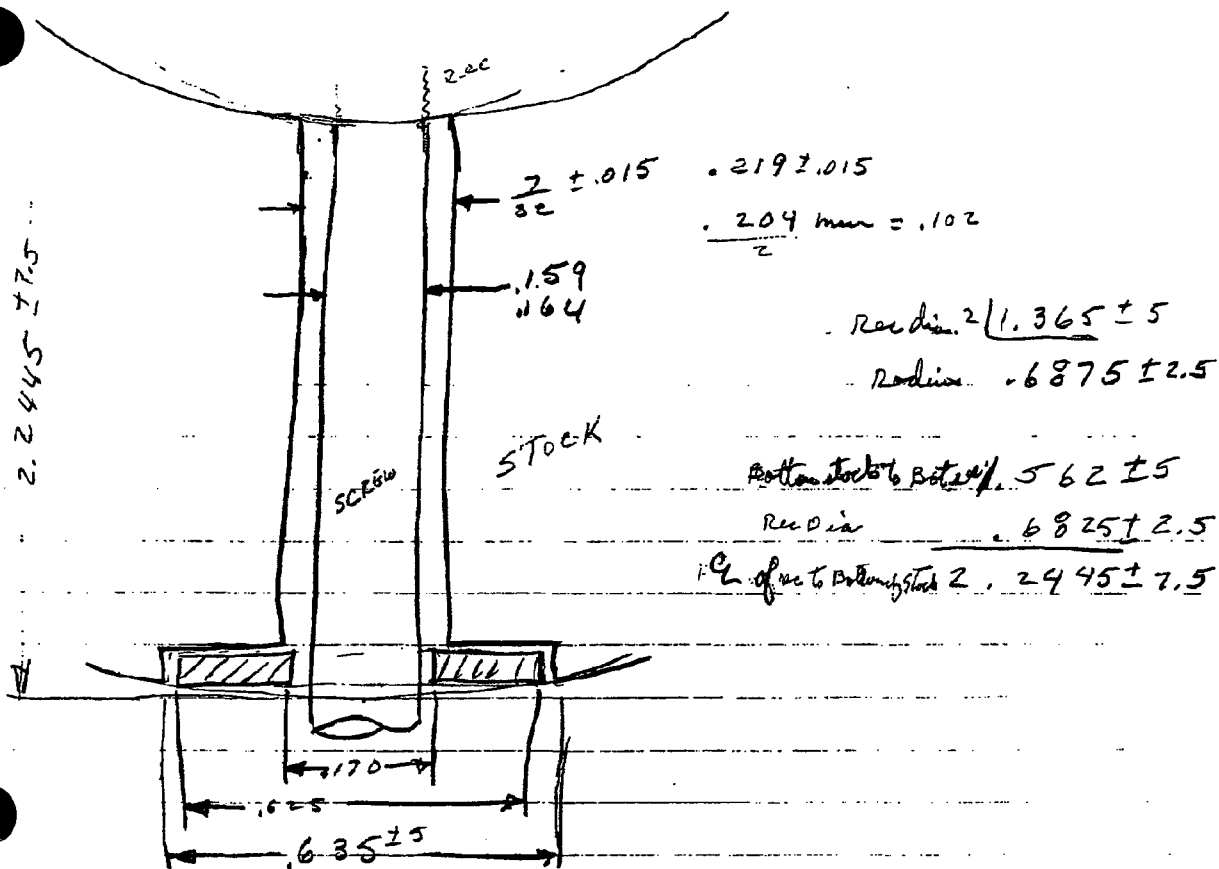
.007

Trigger coils in Housing (max) (see above)

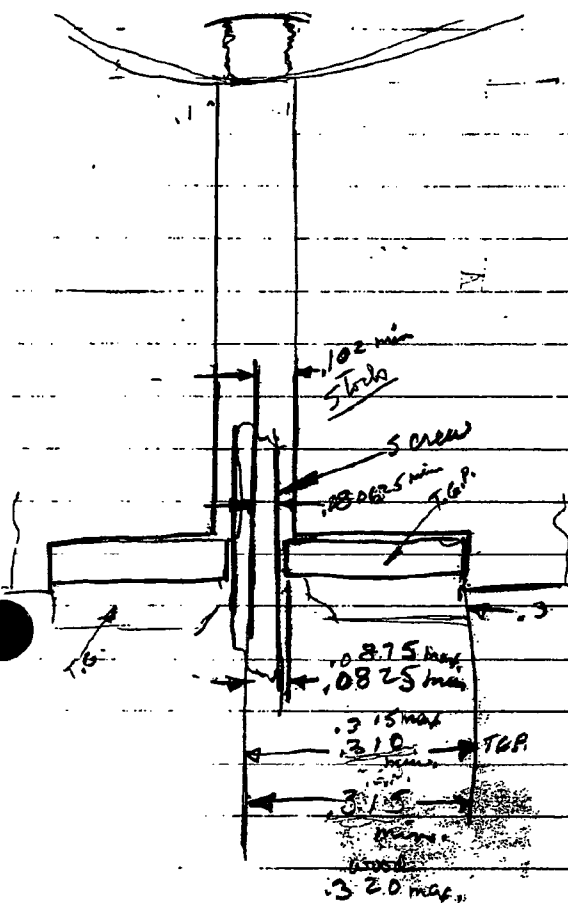
.001

max. .010

7



Rear Guard Screw hole,
max screw allowable movement,



$$\begin{aligned} \text{T.G.P. rear hole} &= \frac{1.70 \pm .085 \pm .05}{2} \\ \text{Rear Guard screw} &= \frac{1.615 \pm .0875}{2} \\ \text{T.G.P.} &= \frac{.625 \pm .3}{2} = .3125 \pm .15 \end{aligned}$$

max work 320

min T.G.P. 310 screw hole in center

.010 plate of cam be offset

max T.G.P. rear guard screw hole .0875 screw hole off

min rear guard screw .0806

.0069 screws can be off set

Rear Can. Turned and

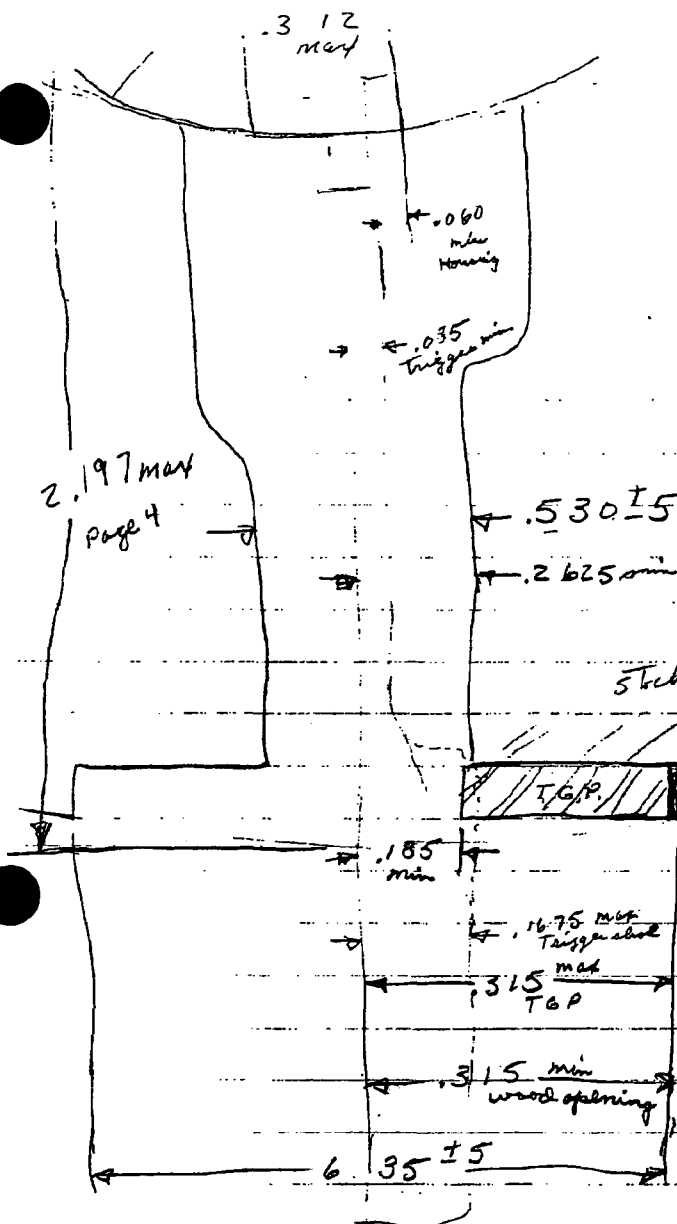
Rear guard screws can be

displaced

.010
.0069

.0169 max

(9)



$$T.G.P. \frac{.625 \pm .5}{2} = .3125 \pm .25$$

$$\text{Opening in T.G.P. } \frac{.375 \pm .15}{2} = .1875 \pm .25$$

$$\frac{.530 \pm .5}{2} = .265 \pm .25$$

2.312 max Receiver opening for Housing
.156

+ .002 max allowable off set per Receiver Print ($\pm .002$)
.158

- .060 min housing plate thickness
.098

- .085 min Trigger body in Housing
.013

+ .1675 max trigger shoe

.1805 max horizontal off set of trigger

+ .008 max Trigger displacement from cocking (Page 6)

.1885 max trigger displacement due to worst tolerances.

- .185 min T.G.P.

.0035 max interference of trigger with Trigger Guard Plate.
with present Trigger & without rotation of Rec.

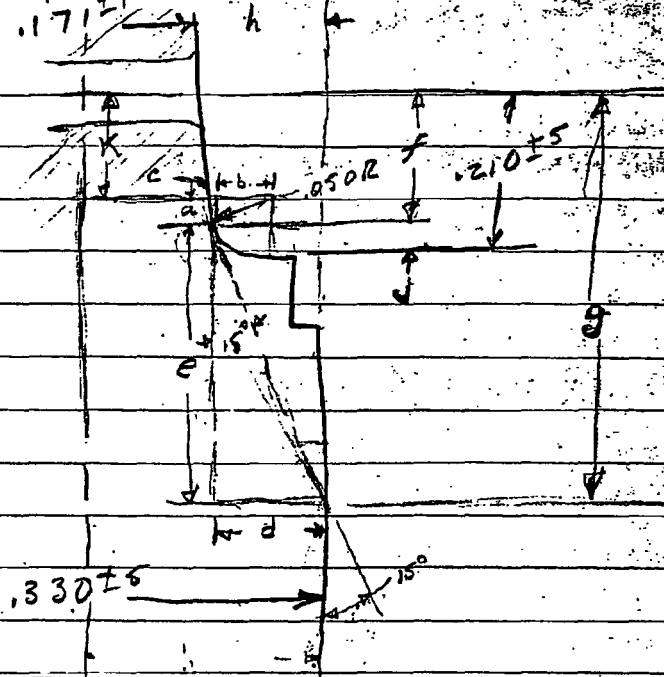
.518 min (Page 2) 3 sec Pin hole in Receiver to E of Receiver
 + 1.239 min (Page 3) 3 sec pin hole in housing to trigger Pin hole.
 + .460 min (Page 1) Trigger pin hole to beginning of trigger 15° relief cut.
 2.217 min distance from E Receiver to relief on trigger

2.197 max Page 4
 - .083 min. Page 5
 + .052 max. Page 5
 2.166 max distance from E stroke to bottom of trigger & wand Plate.

2.217

2.166

.051 clearance on trigger to T.S.P.



$$h = \frac{.330 - .171}{2} = .0795$$

$$\cos 15^\circ = \frac{b}{.050 \pm .5}$$

$$b = .048296$$

$$c = .050 - b = .0017$$

$$d = h - c = .0795 - .0017 = .0778$$

$$\tan 15^\circ = \frac{d}{e}$$

$$e = \frac{d}{\tan 15^\circ} = \frac{.0778}{.2741} = .29035$$

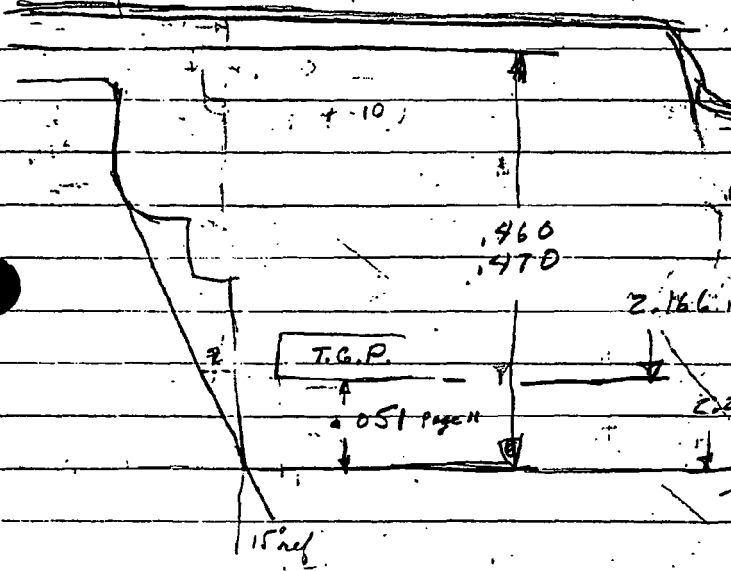
$$\sin 15^\circ = \frac{a}{.050}$$

$$a = .01294$$

$$K = .210 \pm .5 - .050 \pm .5 = .160 \pm .10$$

$$g = K + a + e = .160 + .0129 + .2904$$

5.4633 use 4.60 - 4.70 for
P. unit change



$$\tan 15^\circ = \frac{x}{.051}$$

$$x = \tan 15^\circ \times .051$$

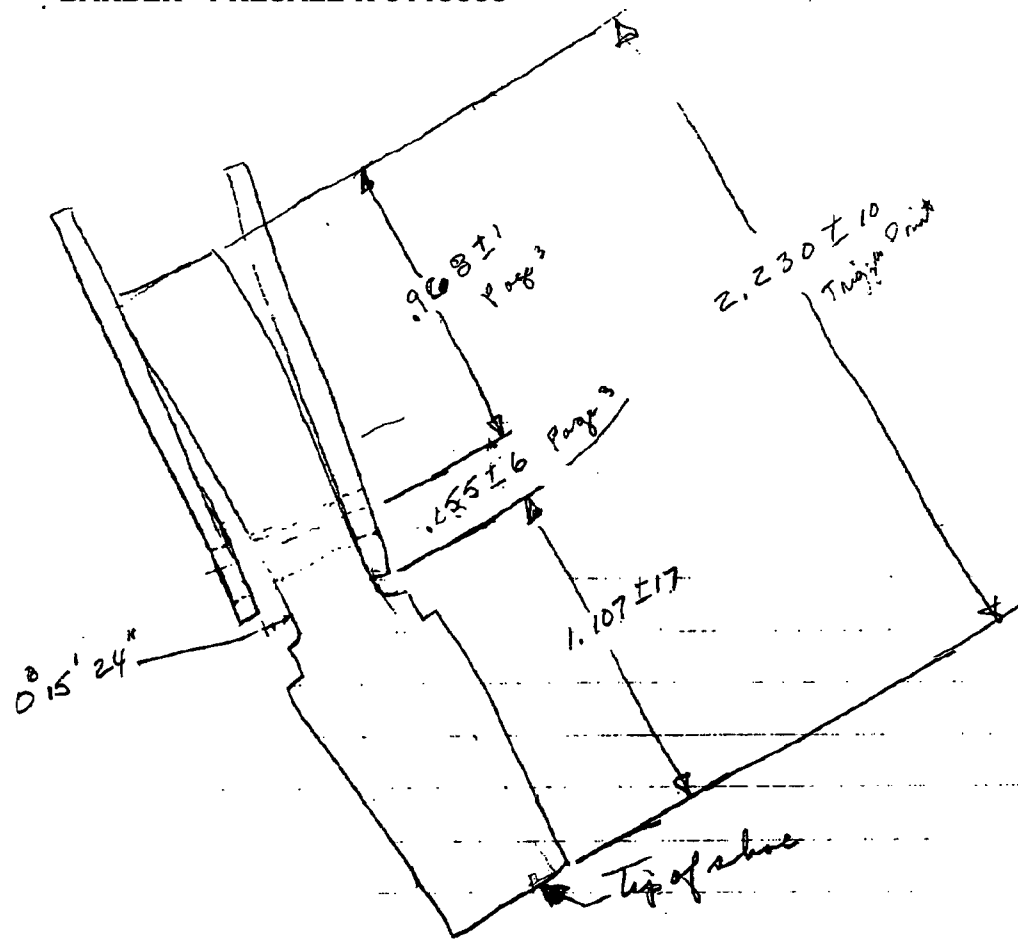
$$= .013665$$

$$= .0035 \text{ page 10}$$

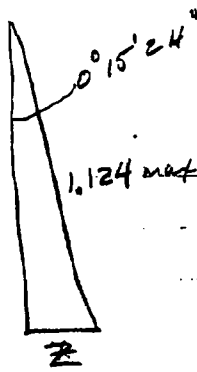
without rotation of receiver.

.010165 clearance between Trigger T.G.P. in worst condition

(3)



$$\begin{array}{r}
 .968 \pm 1 \\
 .155 \pm 6 \\
 \hline
 1.123 \pm 7 \\
 2.230 \pm 10 \\
 1.123 \pm 7 \\
 \hline
 1.107 \pm 17 \\
 1.124 \text{ max.}
 \end{array}$$

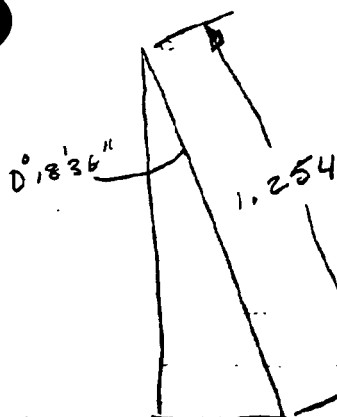


movement of trigger (max) in housing

$$\sin 0^{\circ}15'24'' = \frac{Z}{1.124}$$

$Z = .005$ Trigger shoe movement when trigger is maximum cocking in housing.

Tip of Housing mark on clear Pin.

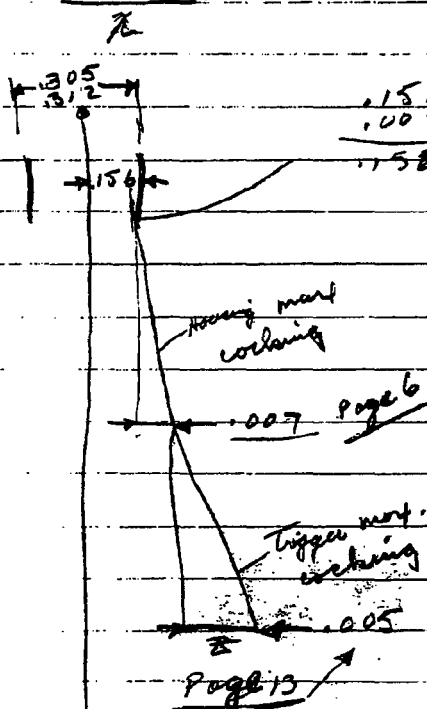


$$5 \text{ in } 0^{\circ}18'56'' = \frac{x}{1.264}$$

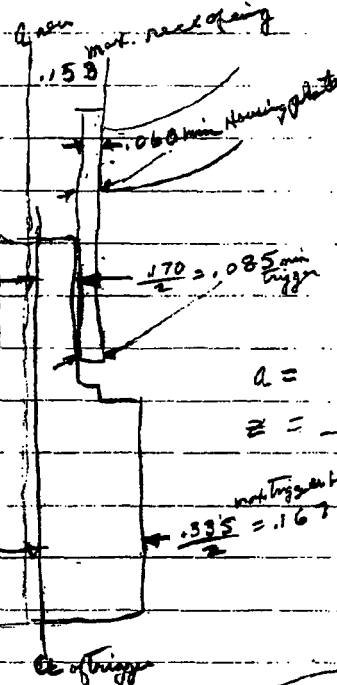
$$x = .006952$$

Page 6

Page 10



$$\frac{.156}{.102} \text{ max allowable independent fan}$$



$$\begin{array}{r} .158 \\ -.060 \\ \hline .098 \\ -.085 \\ \hline .013 \end{array}$$

$$+ .1675$$

$$.1805$$

$$a = +.0071$$

$$z = +.005$$

$$.1925 \text{ max.}$$

$$\frac{.335}{2} = .1675$$

Trigger shoe movement to one side.

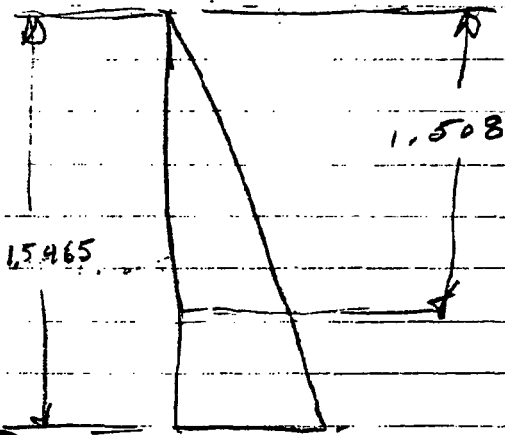
Trigger Guard is measured .450
at point that is closest to tip of trigger.
Step = .225

$$.193 \text{ from above}$$

$$.032 \text{ clearance between}$$

Trigger Bow + outside edge of Trigger shoe with out rotation of receiver.

- Now Trigger can cock .010 max to one side (Page 6)
 & Receiver can be twisted .0169 max (Page 8) then
 trigger can move (at trigger plate guard) .010 +



2.166 Page 11

- .658 Page 5

1.508 max dist from Bottom
of rec to bottom of T.G.P.

$$\frac{1.5465}{.0169} = \frac{1.508}{X}$$

.0169 page 8

$X = .014479$ movement of
 trigger assembly at T.G.P.
 when receiver is twisted
 max amount so that rear
 guard screw fills condition
 set up on page 8.

2.2525 max. Page 7

- .083 min Inlet Page 5

+ .052 max T.G.P. Page 5

- .675 min rec radius P.

1.5465 max. distance from receiver to
 bottom of T.G.P. three
 rear guard screw hole.

Trigger can be off set .010

+ .0165

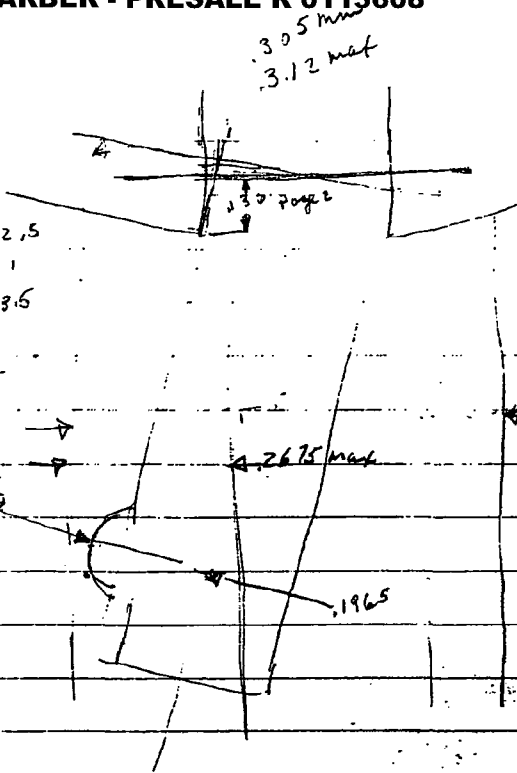
Total possible movement .0265

OR .0165

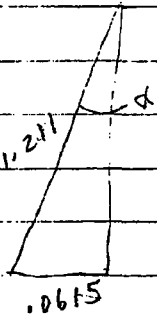
- .0102

.0063 max trigger interference if receiver
is rotated.

1.0595 ± 2.5
 .150 ± 1
 1.2075 ± 3.6



.048 mm rivet head
 + .060 in Housing Photo
 + .0865 in Housing opening
 .1945
 - .002 off set of rec Housing slot
 .1925 mm clearance to head of rivet
 .2675 max wood opening
 .206
 .0615 clearance between rivet heads
 wood



$$\sin \alpha = \frac{.0615}{1.211} = .0507844756$$

$$\alpha = 2.9109^\circ$$

I.C.P. before this rivet can be used in wood condition

.156
 .002
 .158
 .048
 .206

.675
1.350
1.3550

2.2545 max (Page 4)

- .675 min radius

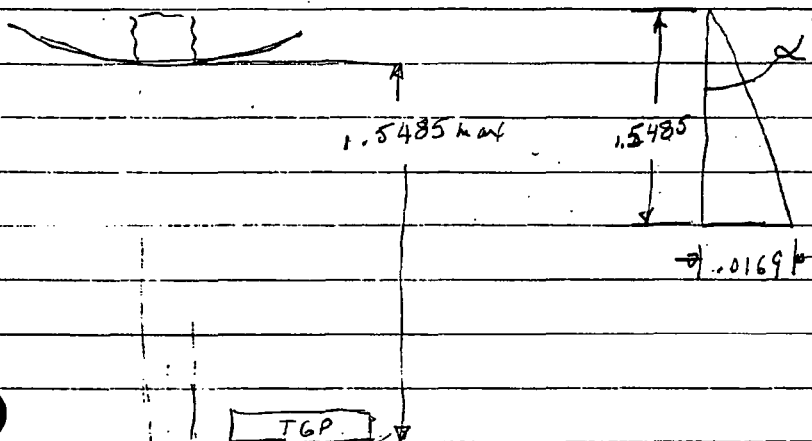
1.5795 max dist from bottom of stock at same given hole

- .083 min alt

1.4965

+ .052

1.5485 max



$$\tan \alpha = \frac{.0169}{1.5485}$$

$$\tan \alpha = .0109137875$$

$$\alpha = .6252891339$$

$$= 0^\circ 37.51734933'$$

$$= 0^\circ 37' 31''$$

TGP
+ .0169 max Page 8

