

April 6, 1983

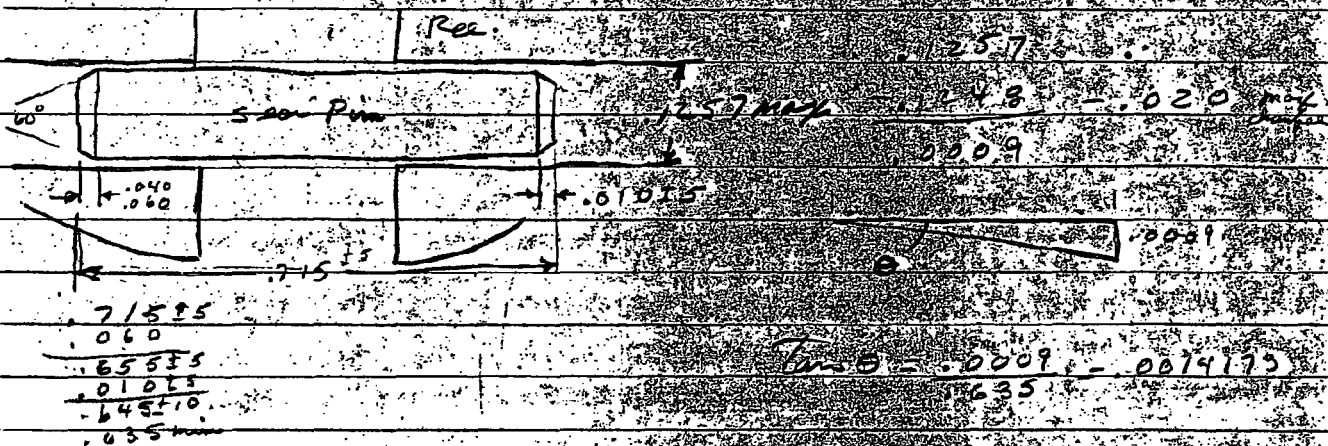
TO: C.B. WORKMAN
FROM: J.W. BROOKS
SUBJECT: MODEL SEVEN LIGHTWEIGHT

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.

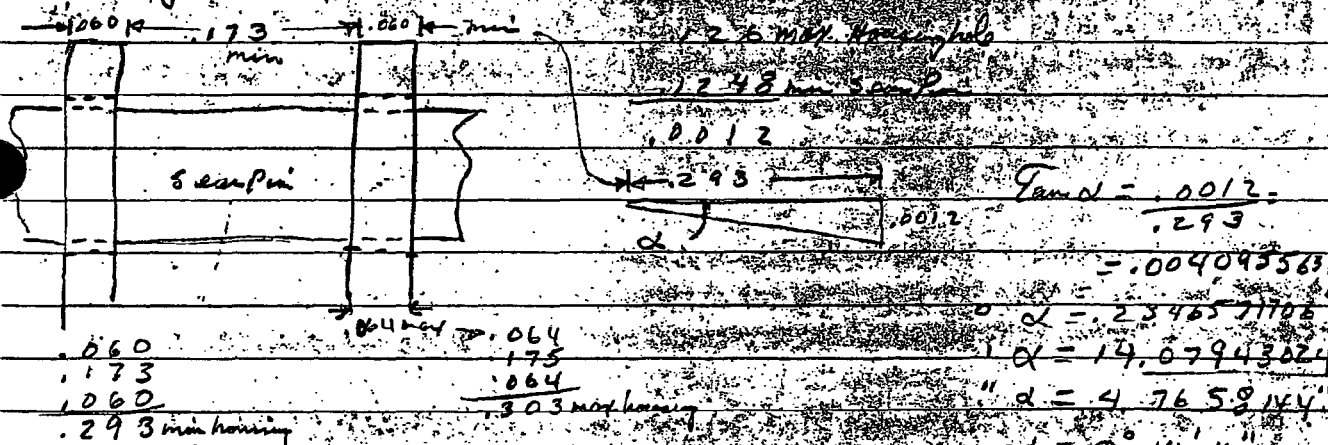
Seam Pin Dia 1248 mm, Length 710 mm
 Receiving seam pin hole 1257 max.



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

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

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

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

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

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



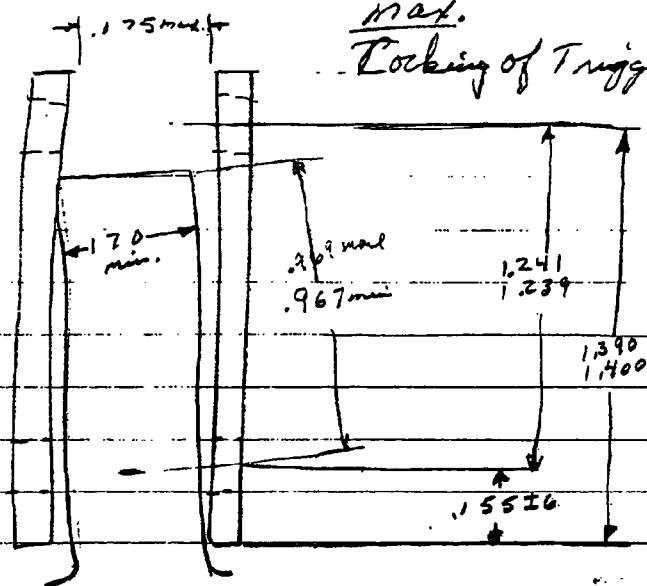
- ① Housing opening in Reservoir . 312 max effect continuity + .002
- ② Housing width . 293 max . 064 + .014 + .176 = 364 max
3. " " . 303 max
4. Seal pin hole in res. from CL . 522 max
5. Bottom of res to 1/2 in . 658 mm
- ⑥ Seal pin hole to top of Housing . 155 mm

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

$\tan \alpha = \frac{.019}{.291} = .065292$
 $\alpha = 3^\circ 44' 8'' \text{ max tip of Housing in Res.}$

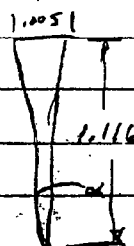
Even if Housing is max width the movement of housing could still be over 3°
 ∴ The seal pin is the control for movement of Housing in res.

max.
Picking of Triggers in Housing (Discounting Trigger Pain)



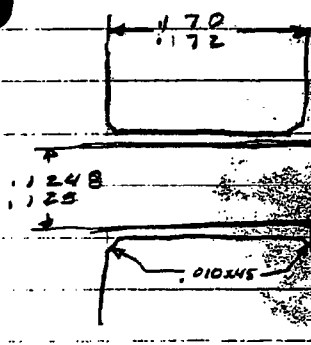
1.395 ± 5 $.175$
 1.240 ± 1 $.170$
 $.155 \pm 6$ $.005$ mod clearance
 between trigger
 & Housing.
 $.467$
 $.149$ min

1.1 1 to min amount of trigger is Housing
to give max amount of cocking.



$$\begin{aligned} \tan \alpha &= \frac{.005}{1.116} \\ &= .00448 \\ \alpha &= 0^\circ 15' 24'' \end{aligned}$$

Max cocking of trigger on Trigger Pin



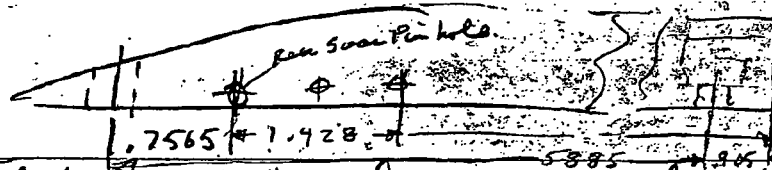
1264 .170
 1248 .030 max 2 sides of trigger
 0010 .140 min trigger assembly
 surface.

$$T_{\text{on}} = \frac{.0016}{.140} = .011428$$

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

Control

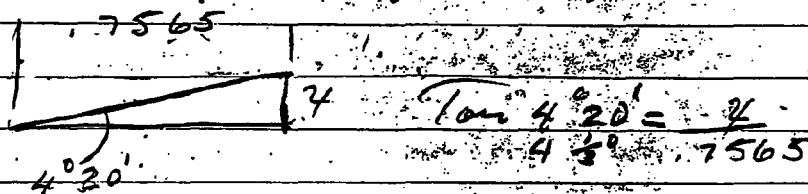
∴ The limiting cocking of the trigger in the housing is the trigger & housing and not the trigger pin & hole.



(4)

Stock cross section dim at Rear 500 Pin hole

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

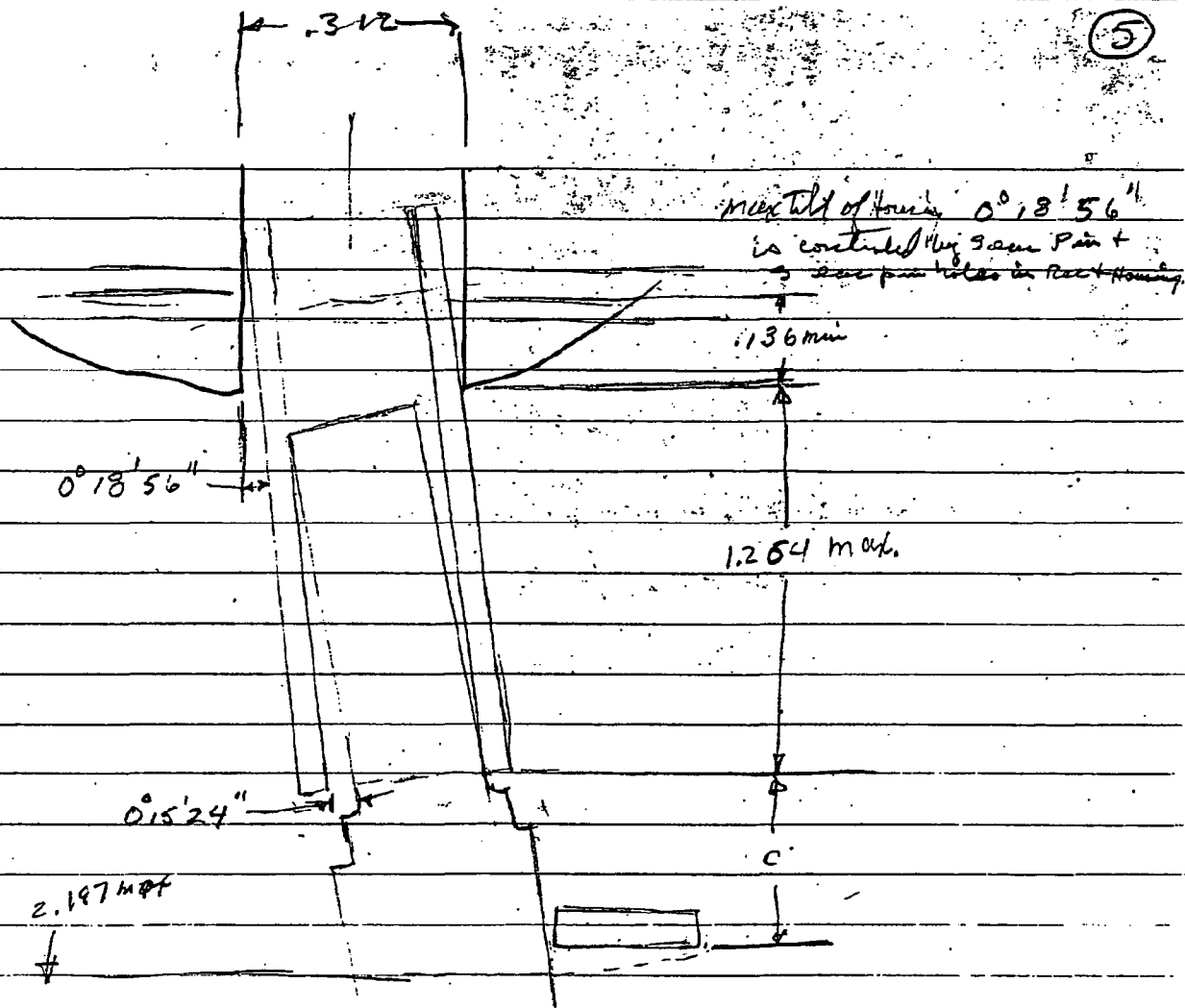
6.790 ± 6

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) - .108.3

10. Trigger guard Plate (max) + .052

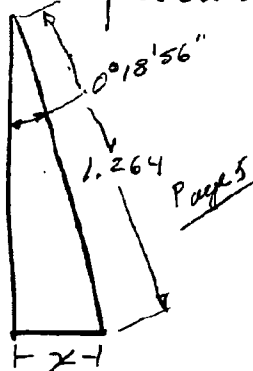
A C1 sec to bottom of rec (Page 2) (min) - .652

1.508

1.264 min.

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

Housing cocks in rec max.

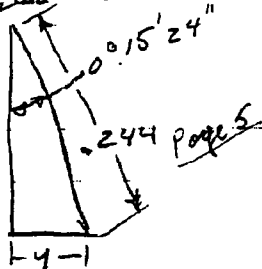


$$\sin 0^{\circ}18'56'' = \frac{x}{1.264}$$

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

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

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



$$\sin 0^{\circ}15'24'' = \frac{y}{1.244}$$

$$y = \sin 0^{\circ}15'24'' (1.244)$$

$$= .00448 (1.244) = .00109$$

Max. offset of trigger when cocked to one side.

Housing slot in rec can be offset

± .002

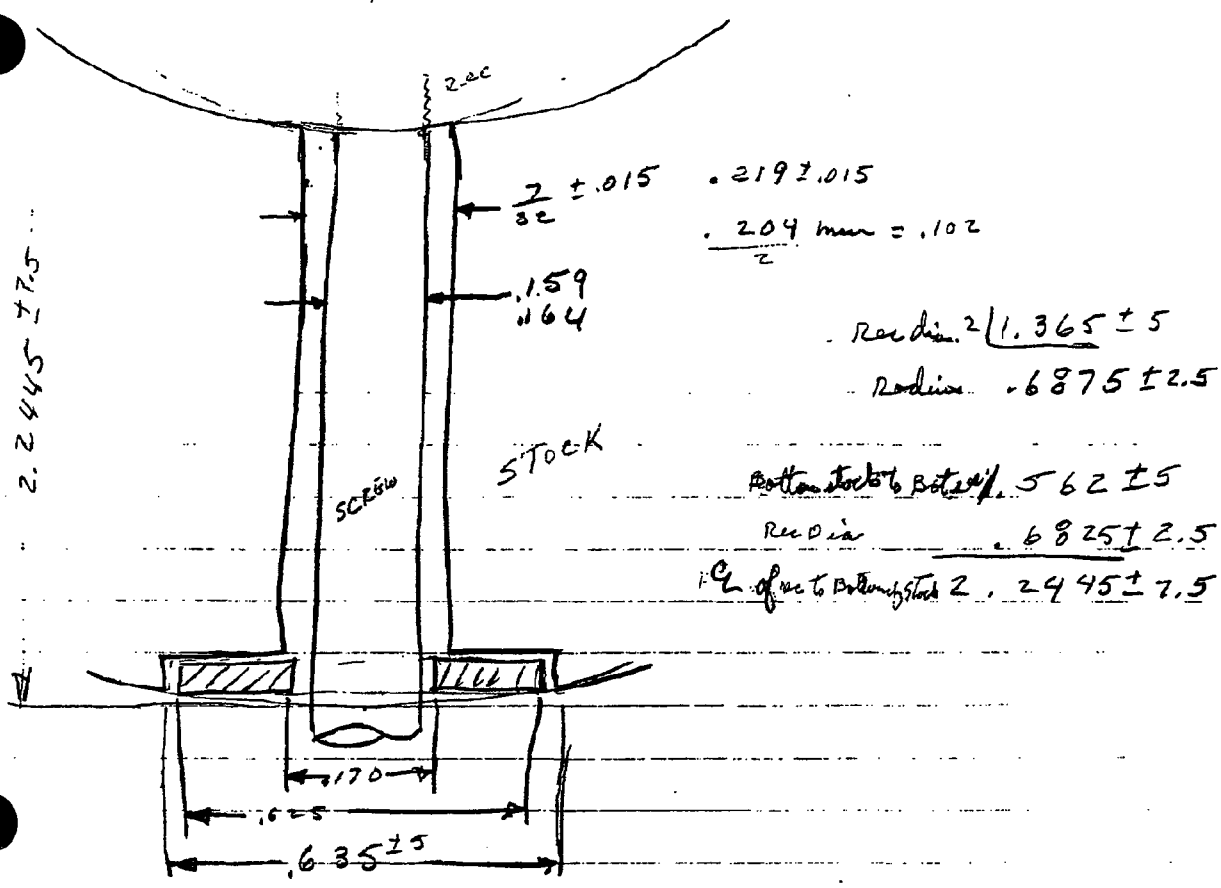
Housing cocks in rec (max) (see above)

.007

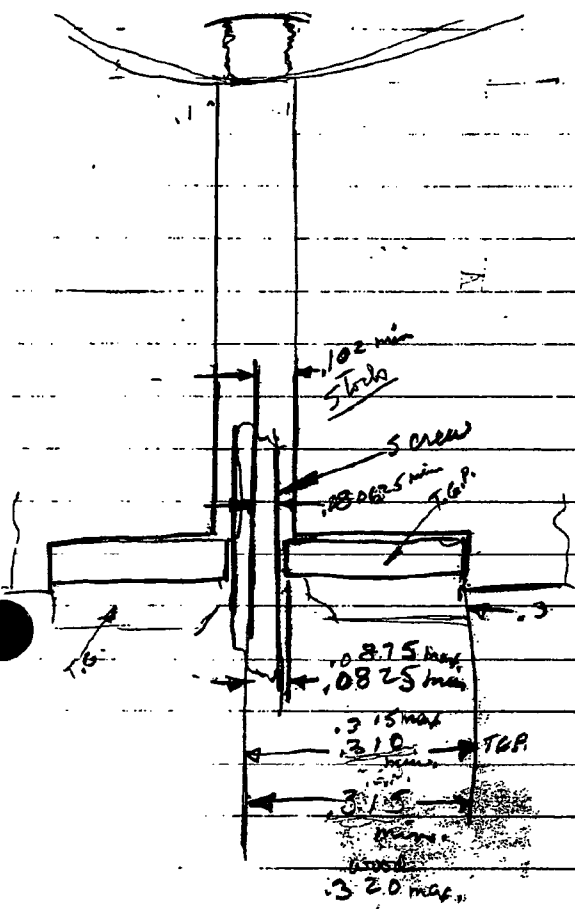
Trigger cocks in Housing (max) (see above)

.001

max. .010



Rear Guard Screw hole.
max screw allowable movement,



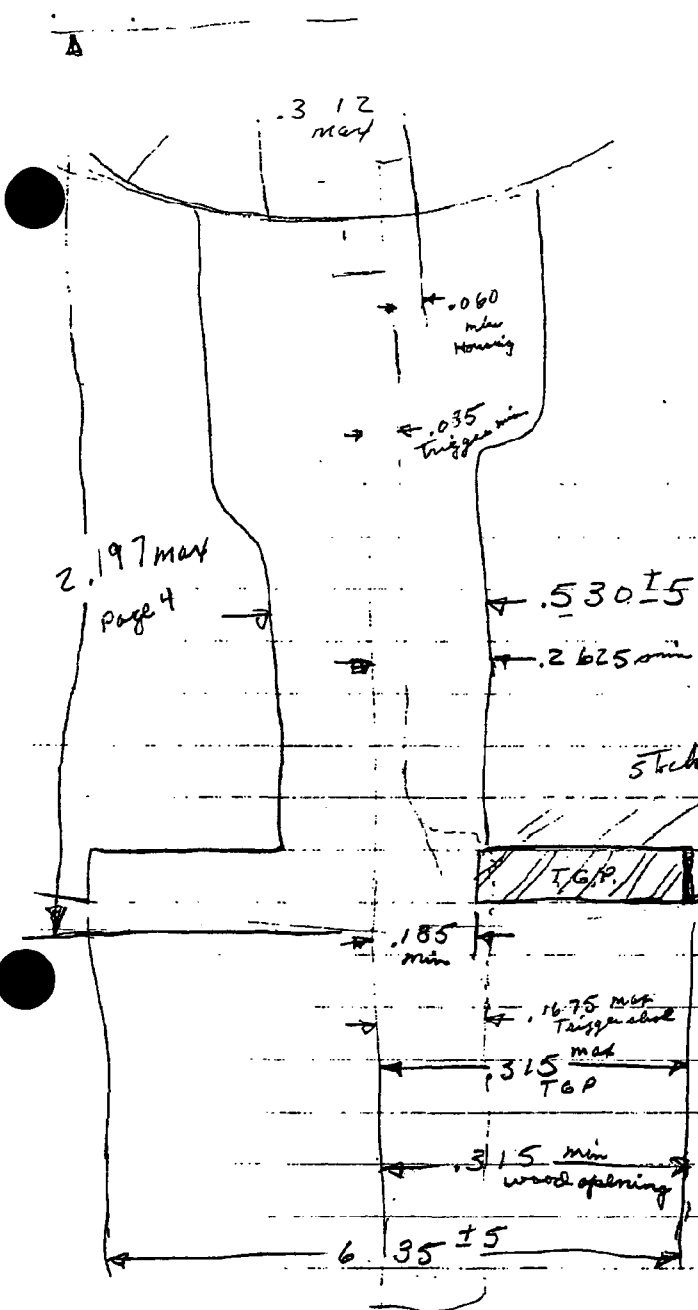
$$\begin{aligned} \text{T.G.P. rear hole} &= \frac{1.70 \pm 5}{2} = .085 \pm .5 \\ \text{Rear Guard screw} &= \frac{16.15 \pm 2.5}{2} = .08075 \\ \text{T.G.} &= \frac{6.25 \pm 3}{2} = 3.125 \pm 1.5 \end{aligned}$$

max work 320
min T.G.P. 310 screw hole in center
.010 plate of can be offset

max T.G.P. rear guard screw hole .0875 screw hole 4/4
min rear guard screw .0806

Rear Can. Turned and
Rear guard screws can be
displaced .010
.0064
.0169 max.

.0069 screws can be off set.



$$T.G.P. \frac{.625 \pm .5}{2} = .3125 \pm 2.5$$

$$\text{Opening in T.G.P. } \frac{.375 \pm .5}{2} = .1875 \pm 2.5$$

$$\frac{.530 \pm .5}{2} = .265 \pm 2.5$$

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.

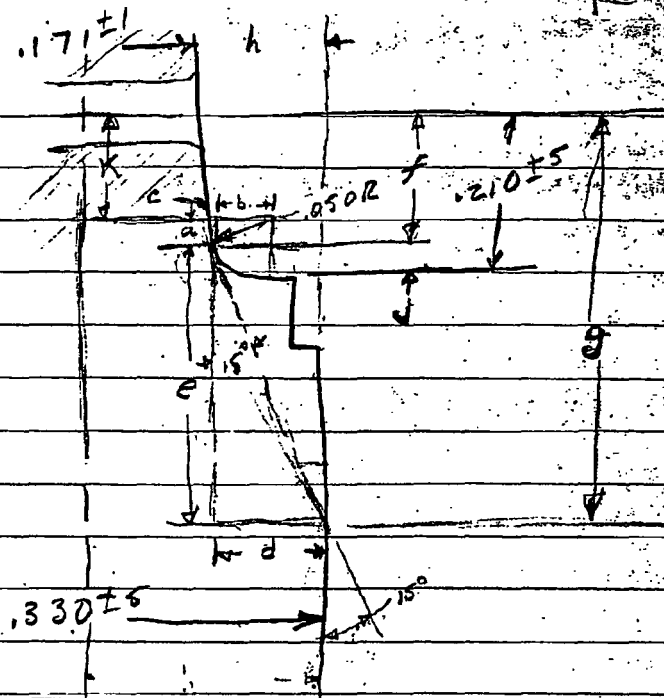
.518 min (Page 2) Sec Pin hole in Receiver to E of Receiver
 + 1.239 min (Page 3) Sec pin hole in housing to Trigger Pin hole.
 + .460 min (Page 1) Trigger pin hole to beginning of Trigger 15° relief cut.
 2.217 min distance from E Receiver to relief on Trigger

2.197 max Page 4
 - .083 min. Page 5
 + .052 max. Page 5
 2.166 max distance from E of stock to bottom of Trigger & wood Plate.

2.217

2.166

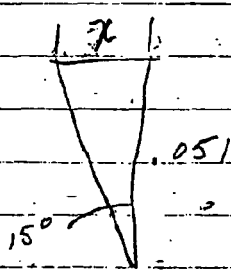
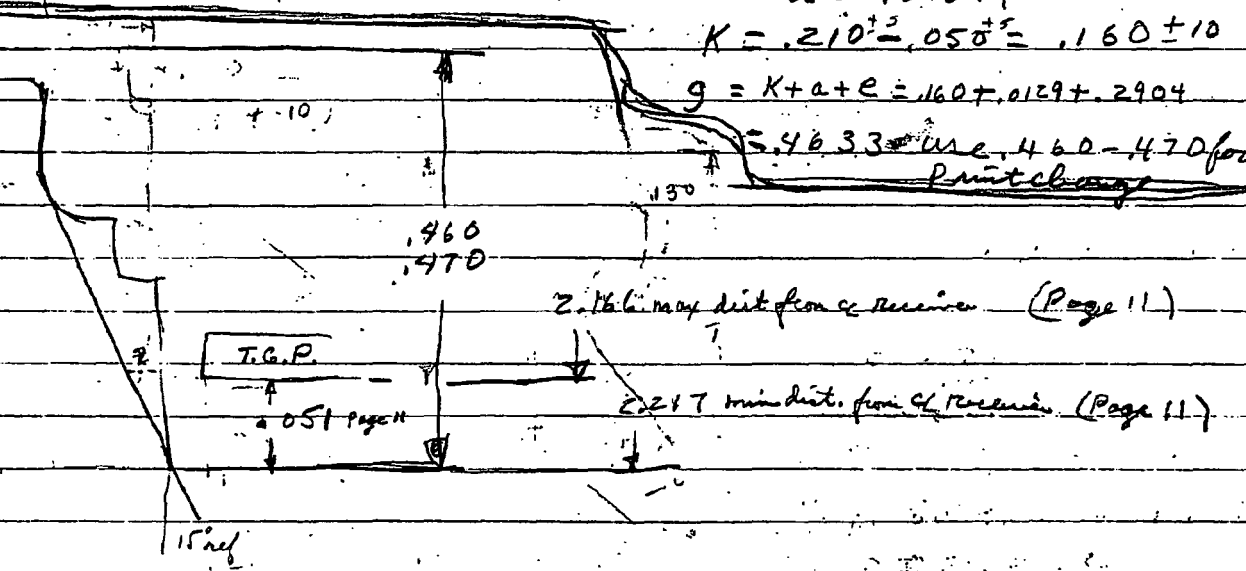
.051 clearance on trigger to T.S.P.



$$h = \frac{.330 - .171}{2} = .0795$$
$$\cos 15^\circ = \frac{b}{.050}$$
$$b = .048296$$
$$c = .050 - b = .0017$$
$$d = h - c = .0795 - .0017 = .0778$$
$$\tan 15^\circ = \frac{d}{e}$$
$$e = \frac{d}{\tan 15^\circ} = \frac{.0778}{.268} = .29035$$

$$\sin 15^\circ = \frac{a}{.050}$$
$$a = .01294$$
$$K = .210 - .050 = .160 \pm 10$$
$$g = K + a + e = .160 + .0129 + .2904$$

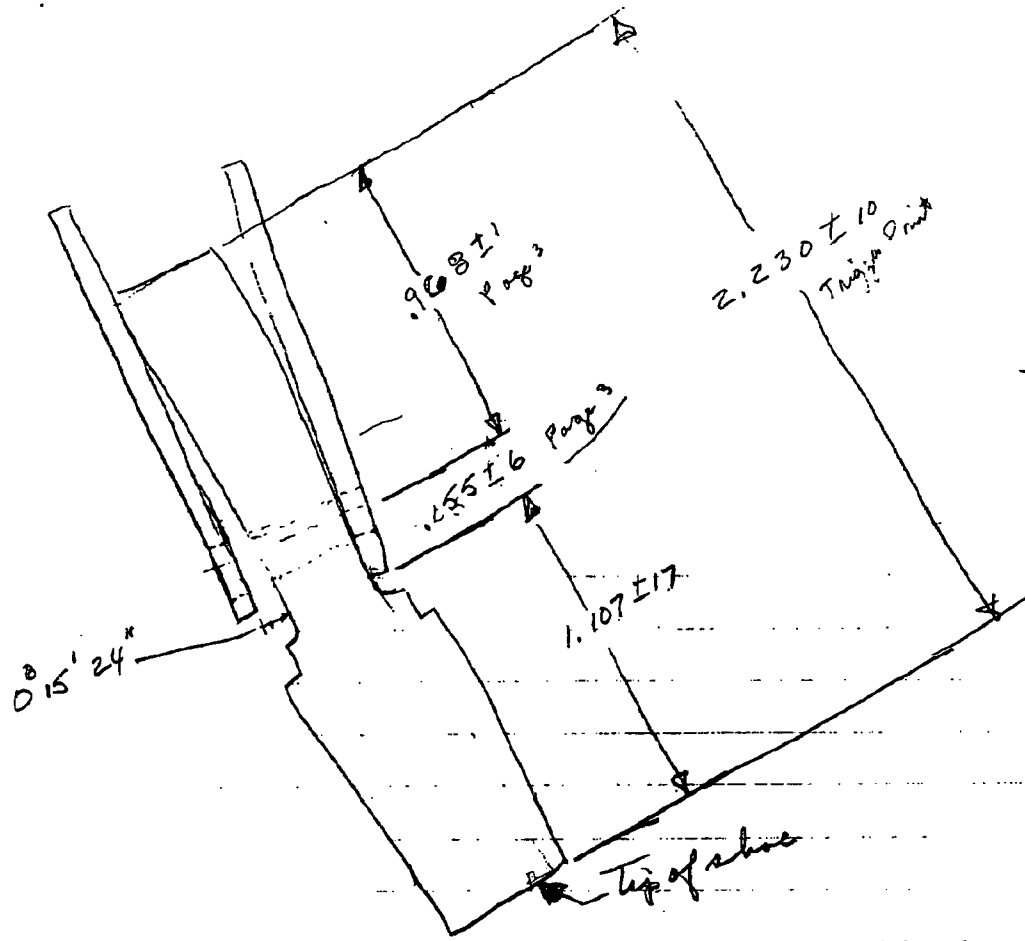
5.4633 use 4.60 - 4.70 for
Print change



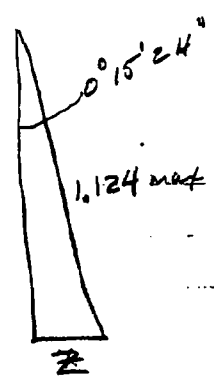
$$\tan 15^\circ = \frac{z}{.051}$$
$$z = \tan 15^\circ \times .051$$
$$= .013665$$
$$= .0035 \text{ page 10}$$

without rotation of receiver.

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



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

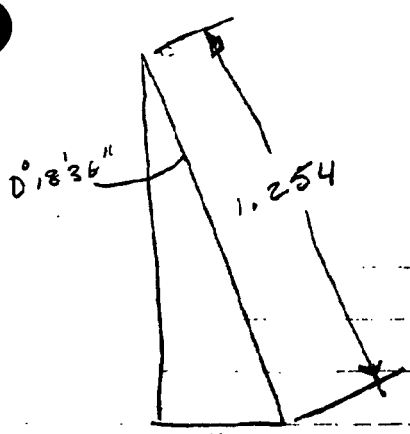


movement of trigger (max) in housing

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

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

Tip of Housing mark on clear Pin.

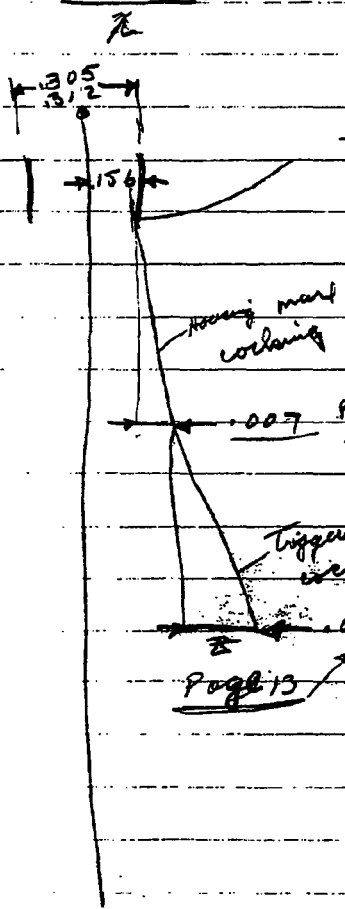


$$5 \text{ in } 0^{\circ}18'56'' = \frac{x}{1.264}$$

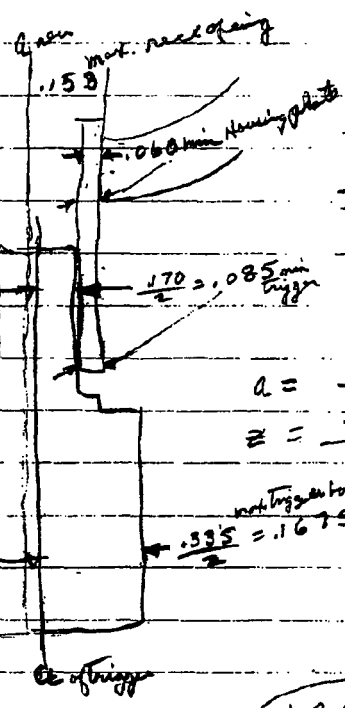
$$x = .006952$$

Page 6

Page 10



$$\begin{array}{r} .156 \\ .002 \text{ max allowable} \\ .158 \end{array}$$



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

$$\begin{array}{r} +.1675 \\ .1805 \\ a = +.0071 \\ z = +.005 \\ .1925 \text{ max.} \end{array}$$

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

Trigger shoe movement to one side.

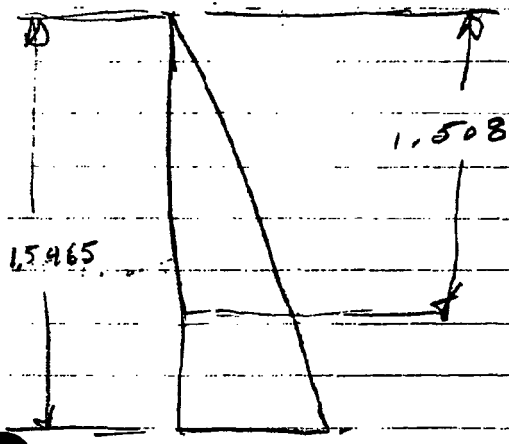
Page 13

Trigger Guard is measured .450 at point that is closest to tip of trigger. $\frac{.450}{2} = .225$

.193 from above

.032 clearance between Trigger Bow & outside edge of Trigger shoe without 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.

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

$X = .014479$ 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.

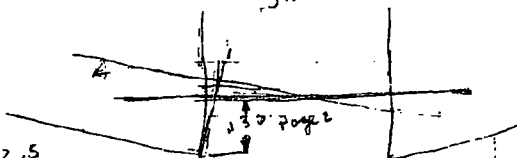
Trigger can be off set .010
 + .0165
 Total possible movement .0265

$$\begin{array}{r} .0165 \\ - .0102 \\ \hline .0063 \end{array}$$

max trigger interference if receiver
 is rotated.

1.0595 ± 2.5
 $.150 \pm 1$
 1.2075 ± 3.6

3.05 min
 3.12 max



$.048 \text{ min rivet head}$
 $+ .060 \text{ min Housing Photo}$
 $+ .0865 \text{ min Housing opening}$

$.1945$

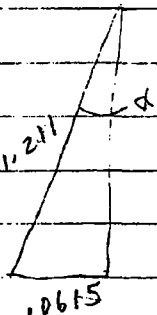
$-.002 \text{ off set of rec Housing slot}$

$.1925 \text{ min clearance to head of rivet}$

$.2675 \text{ max wood opening}$

$.206$

$.0615 \text{ min clearance between rivet heads}$
 wood



$\text{Sine } \alpha = \frac{.0615}{1.211} = .0507844756$
 $\alpha = 2.9109^\circ$

$.156$

$.002$

$.158$

$.048$

$.206$

$\text{I.C.P. before this rivet can}$
 $\text{be used in wood condition}$

.675
 1.350
 1.3550

2.2545 max (Page 4)

- .675 min radius

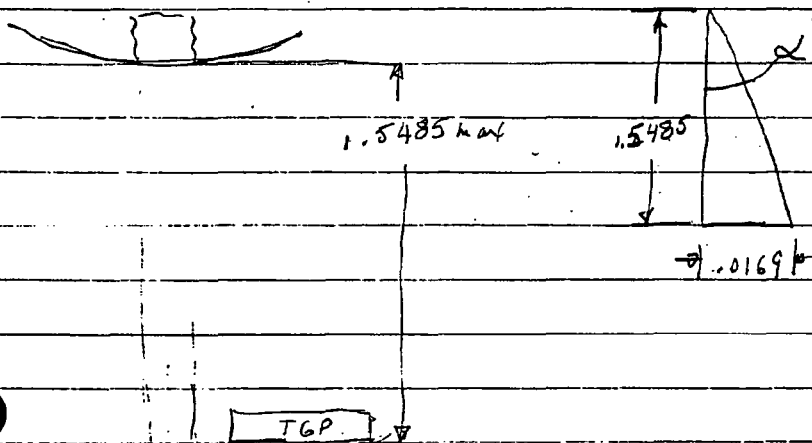
1.5795 max dist from bottom of stock at same given new hole

- .083 min alt

1.4965

+ .052

1.5485 max



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

$$\tan \alpha = .0109137875$$

$$\alpha = .6252891339$$

$$= 0^\circ 37.51734933'$$

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

1.5485 max Page 8

