

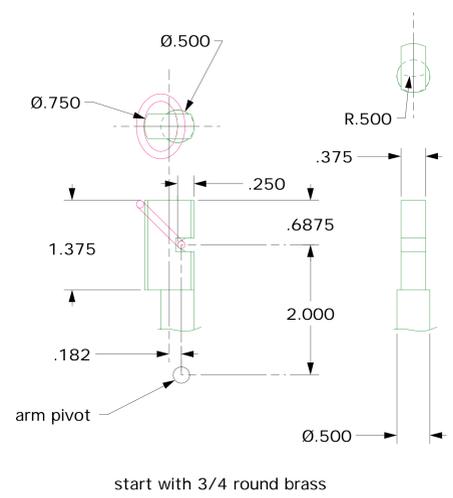
REV	ITEM	PART NUMBER	DESCRIPTION
1			
2			

88 in-lb nominal torque
 2" lever arm
 spring force nominal = $88/2 = 44 \text{ lb} \pm 10 \text{ lb} = 34 \rightarrow 54 \text{ lb}$
 spring range = $\pm 1.414 \text{ in} = 2.828 \text{ inch}$
 $K = 34$
 $K(\pm 2.828) = 54$
 from which
 $K = 7.1 \text{ lb/in}$
 and
 initial = 4.81"

closest spring which is softer is Associated E1000-115-8000
 preload is 4.9 lb
 rate is 6.7 lb/in
 max load is 54.3 lb
 closed length is 8" from extreme insides of loops
 OD is 1.000, wire d is .115, so loop ID is .770
 nominal delta for 44 lb = $(44-4.9)/6.7 = 5.836"$
 F at 1.414" more is $44+1.414*6.7 = 53.47 \text{ lb}$
 F at 1.414" less is $44-1.414*6.7 = 34.53 \text{ lb}$
 good enough!

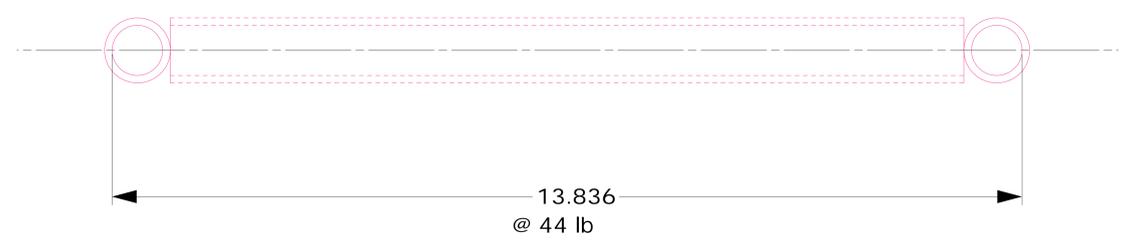
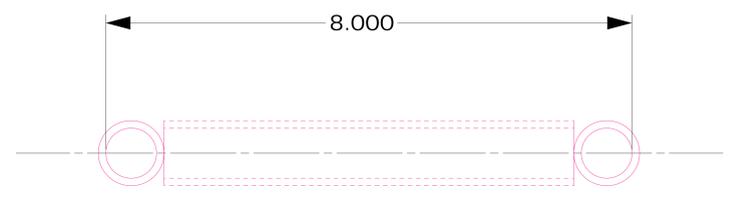
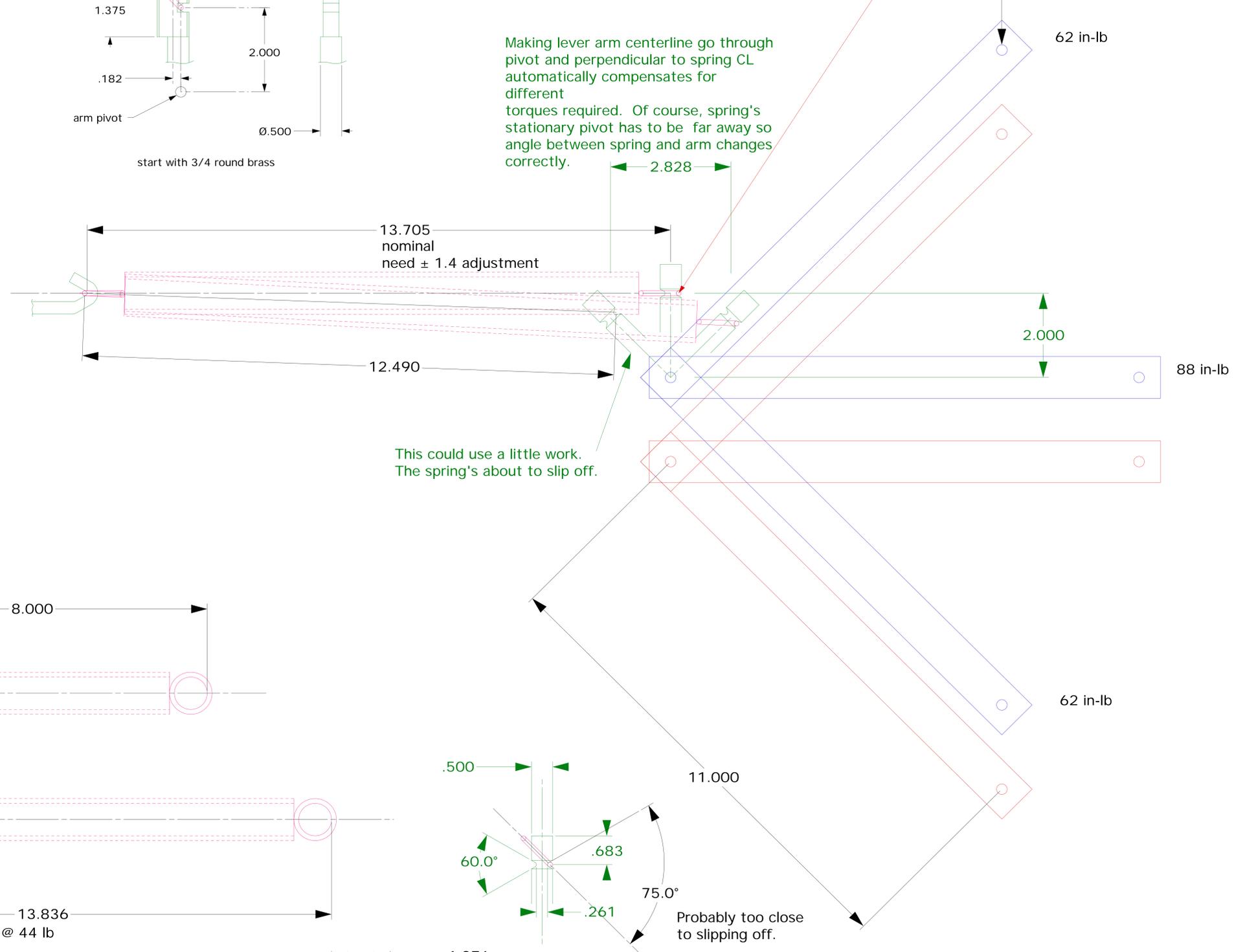
The constancy of the force could be improved by running aircraft cable over a specially-shaped drum. I don't think that's worth the trouble and it likely wouldn't be correct at all spring settings.

Possible hook for extension spring for Gen I mods. This hook would be over the pivot. It's way too expensive so think of something cheaper. The main idea is to have a .500 R for the spring loop to bear against; the chord doesn't need to be more than .375. Then the loop won't wear through. Brass would be a good material. The idea is to prevent failure through one of the common modes (the other being snapping where the loop joins the body of the spring).



The center of the spring loop should be over the pivot

Making lever arm centerline go through pivot and perpendicular to spring CL automatically compensates for different torques required. Of course, spring's stationary pivot has to be far away so angle between spring and arm changes correctly.



actual delta from layout is 1.376
 $1.376 * 6.7 = 9.2 \text{ lb}$
 which is better yet

UNLESS OTHERWISE SPECIFIED				SHOP ORDERS				LAWRENCE BERKELEY LABORATORY				
XX	+	FRACT.	+	ACCT NO.	SER. NO.	UNIVERSITY OF CALIFORNIA - BERKELEY						
XXX	+	ANGLES	+	DATE ISS'D	DATE REC'D	GI_spring_LO.pdf						
XXXX	+	FINISH	+	DELIVER TO		DO NOT SCALE PRINTS						
SURFACE TREATMENT				PATENT CLEAR				DWG. TYPE				
IDENT. METHOD				SHOWN ON				SCALE				
DWN BY JOHN BERCOVITZ				DATE 2/03/07/02				DWG. NO.				
CHK BY				DATE				SIZE REV				
REV	DWN	CHK	ZONE	DATE	CHANGES							