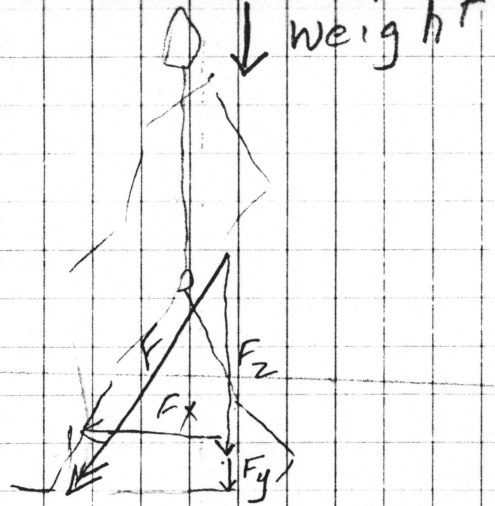


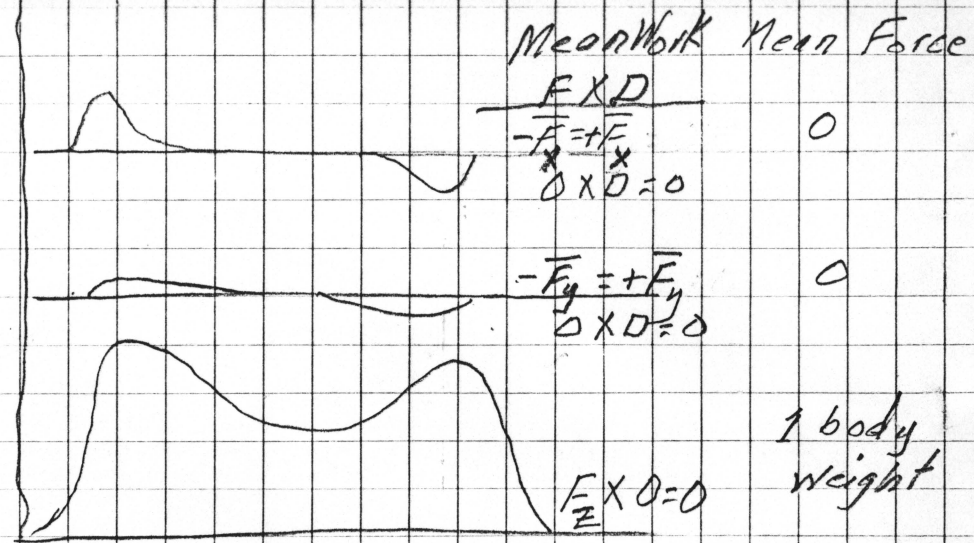
Fig 1



F_x

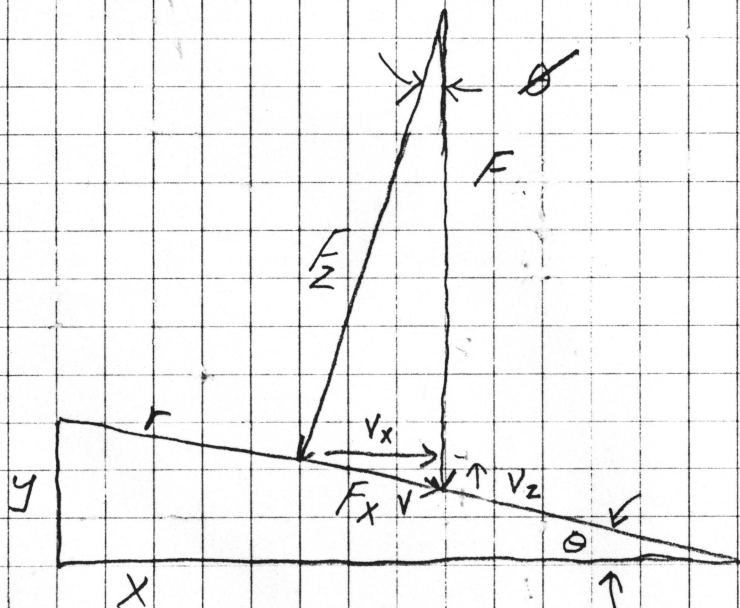
F_y

F_z



Locomotion Force Vector - Level (Zero Grade)

Fig 2A



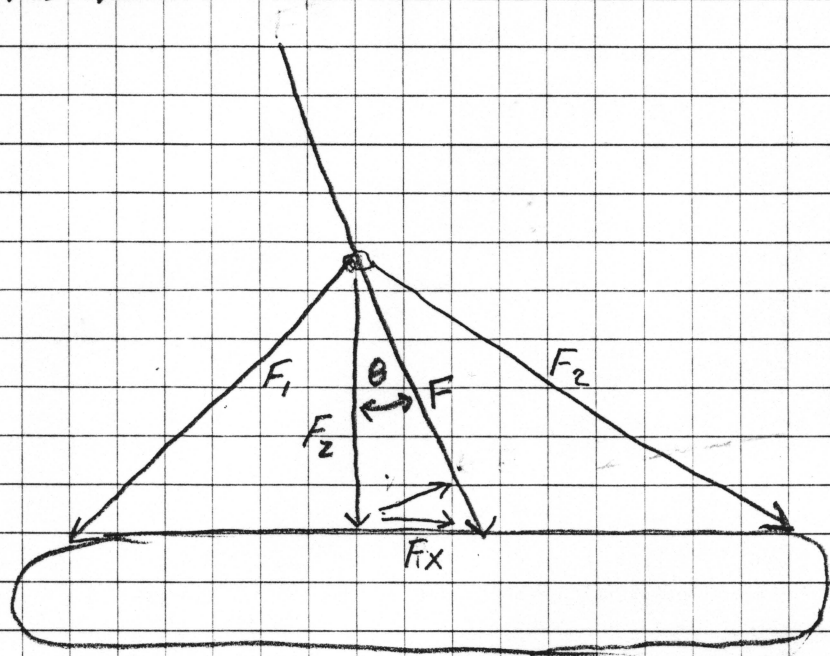
$$\text{Work}_{\text{rate}} = F_z \cdot V_z = F_x \cdot V_x$$

$$V_z = V_{cl} \sin \theta = V_{cl} \cdot \frac{y}{r} (\text{Grade})$$

F = Force
 v = Velocity

$$\frac{F}{r} = \frac{F_x}{y} = \frac{F_z}{x} \quad \phi = \theta$$

Fig. 2B



$$F = \sqrt{F_1^2 + F_2^2}$$

Fig 3

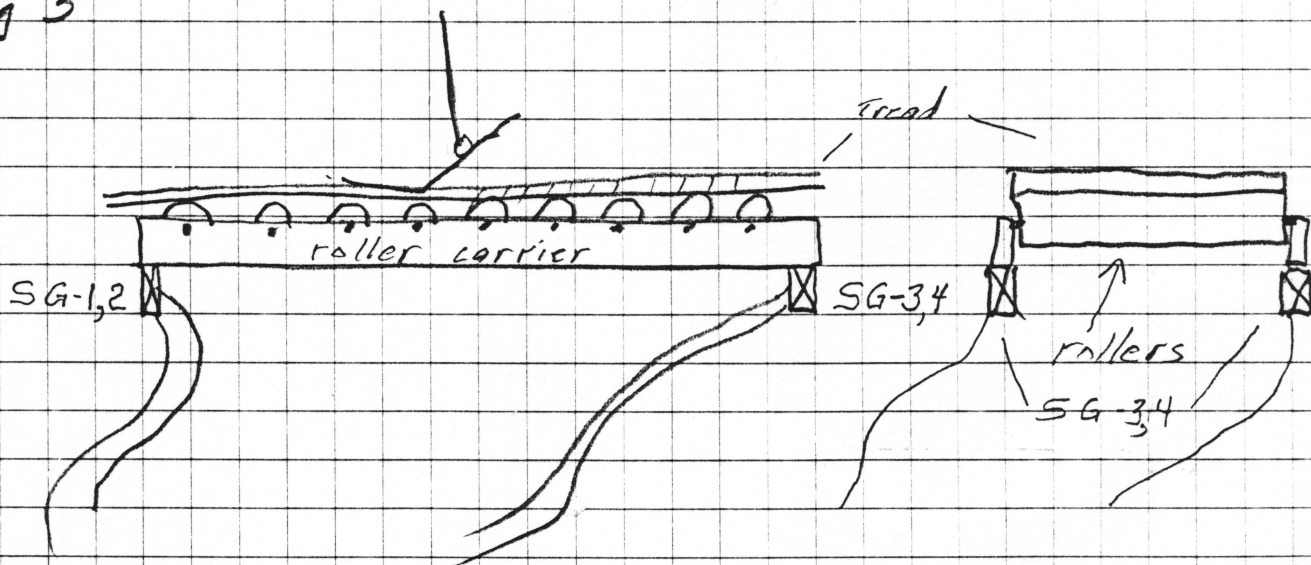
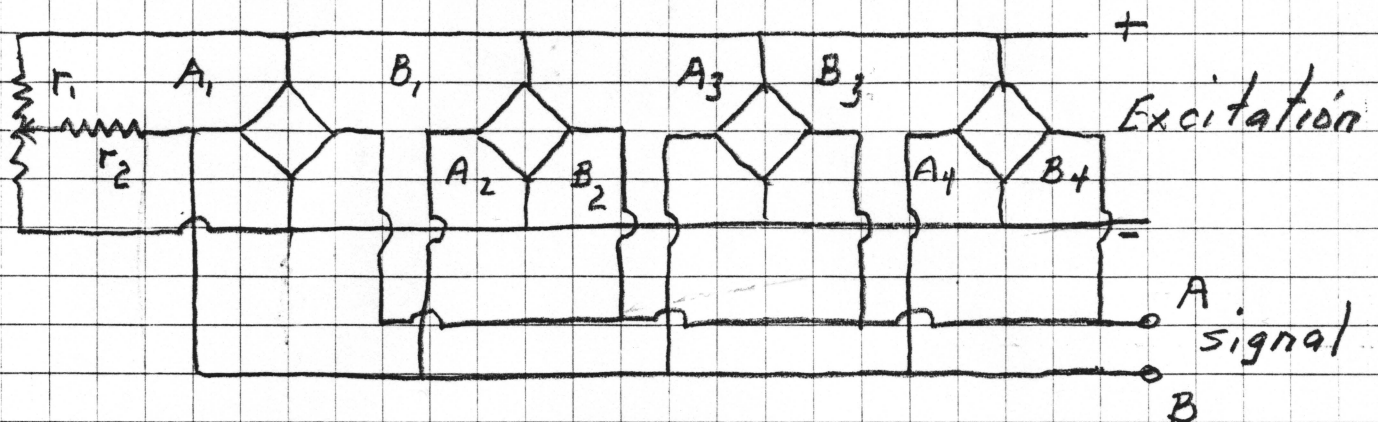


Fig 4.

A.



B.

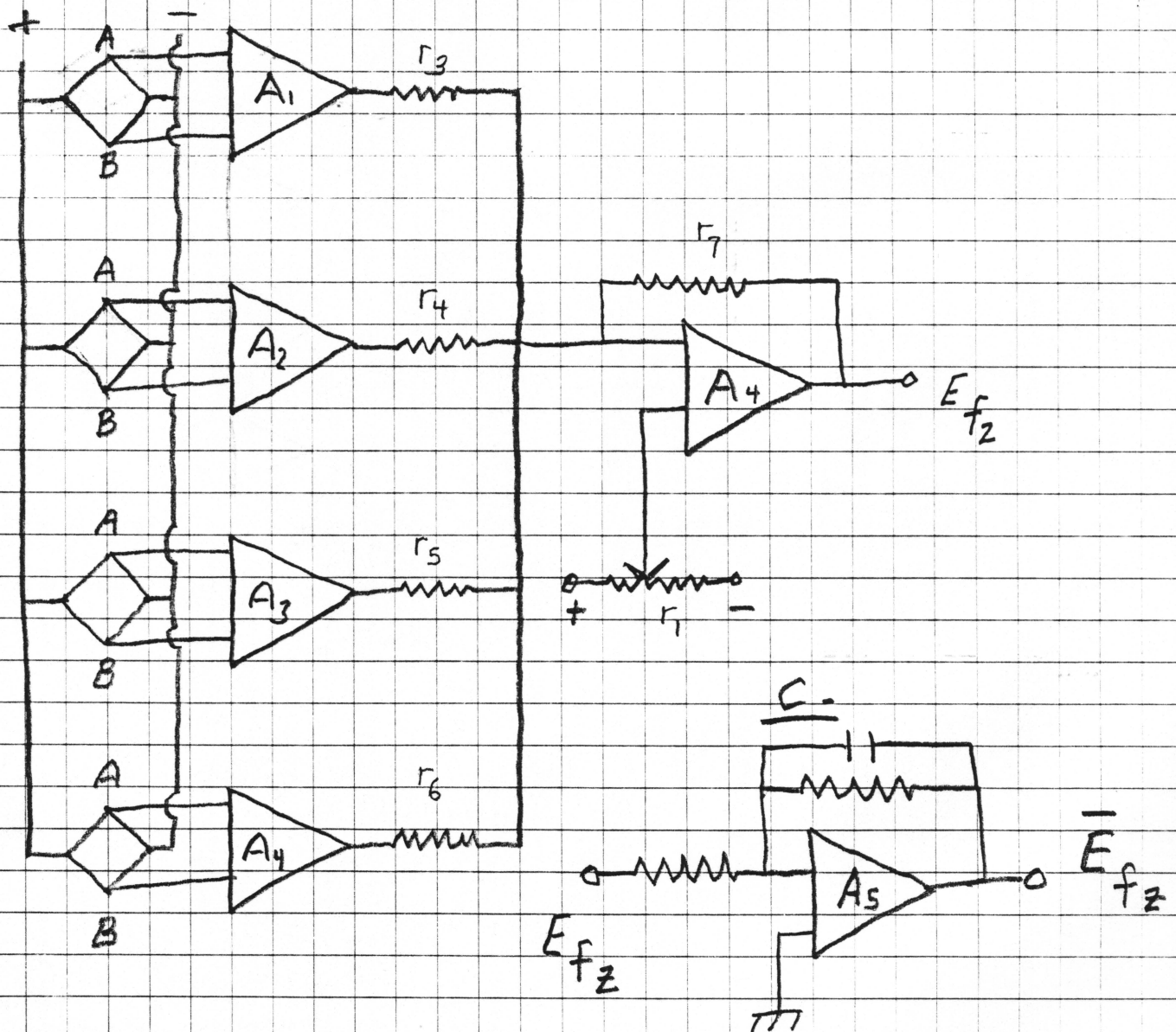


Fig. 5

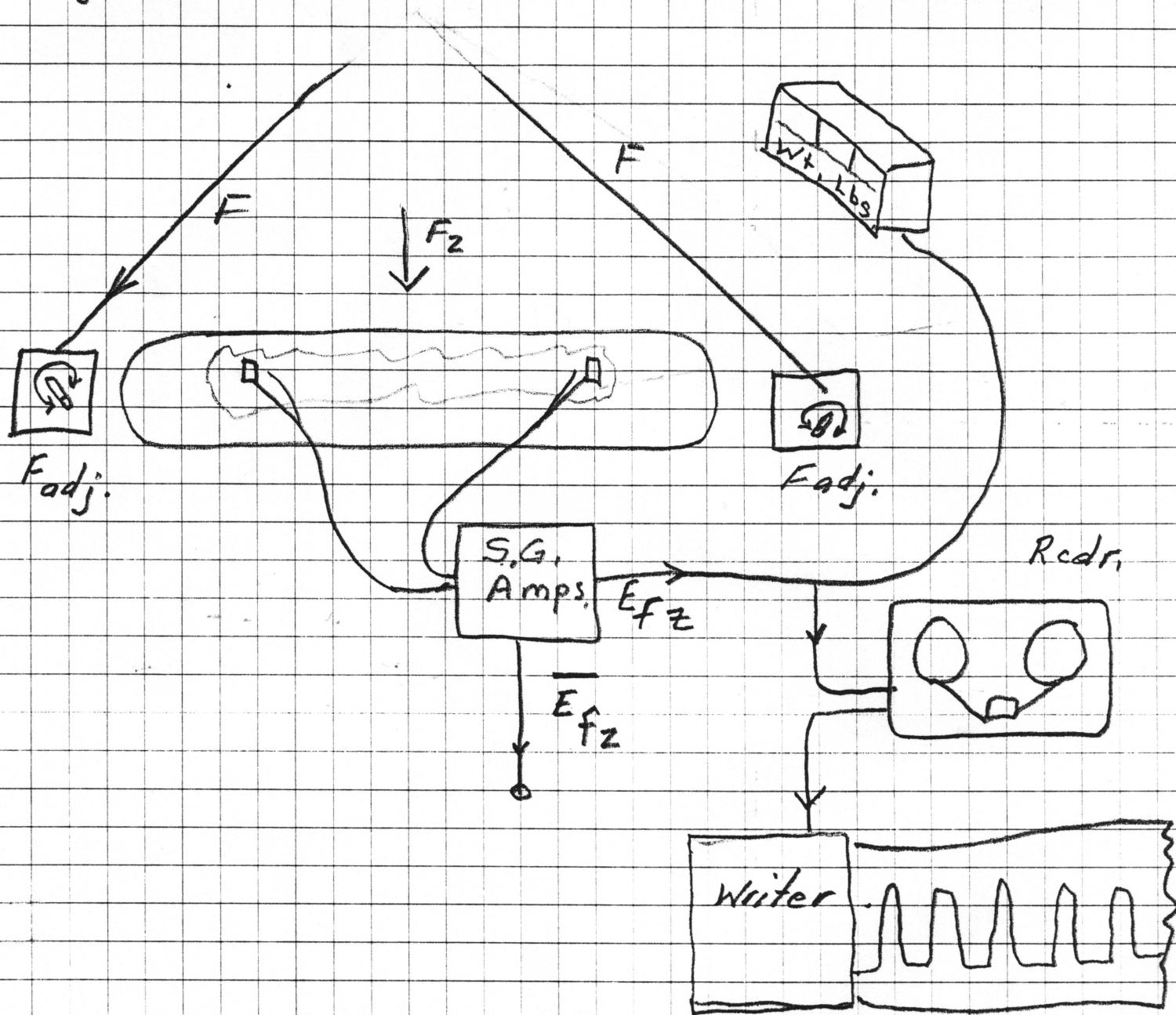


Fig. 6

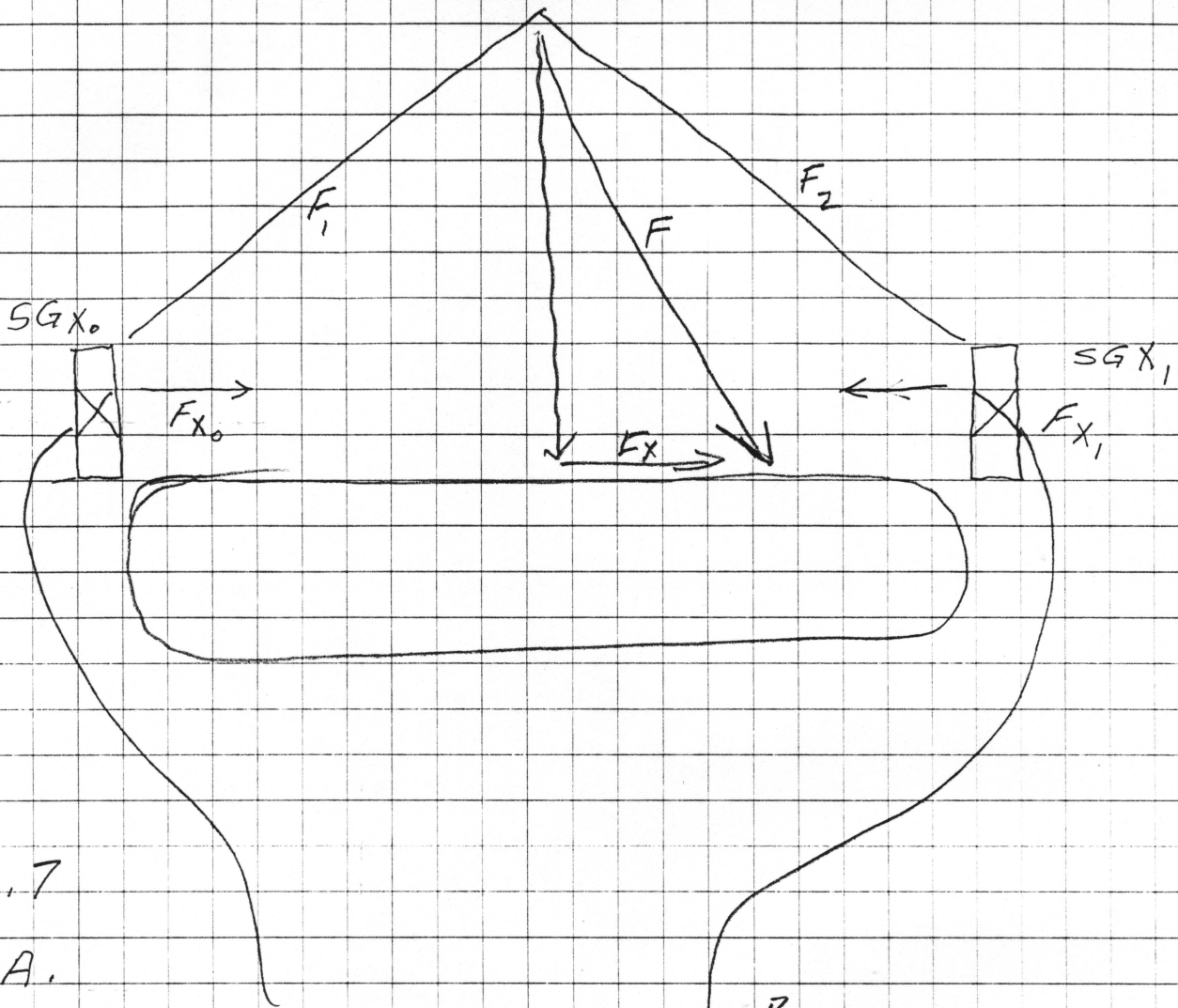
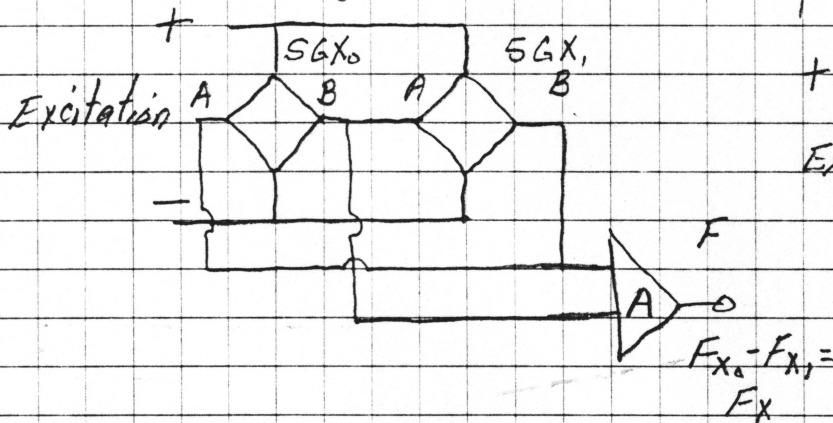
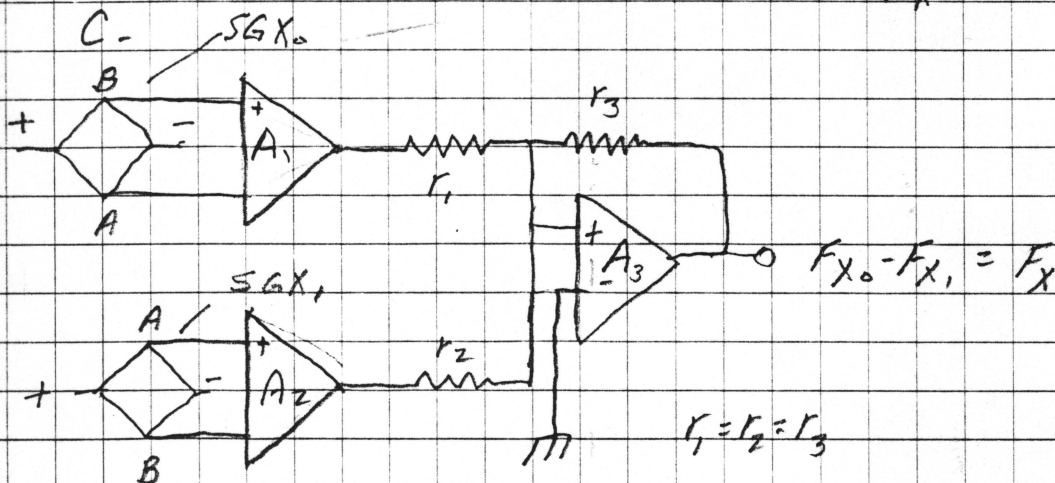
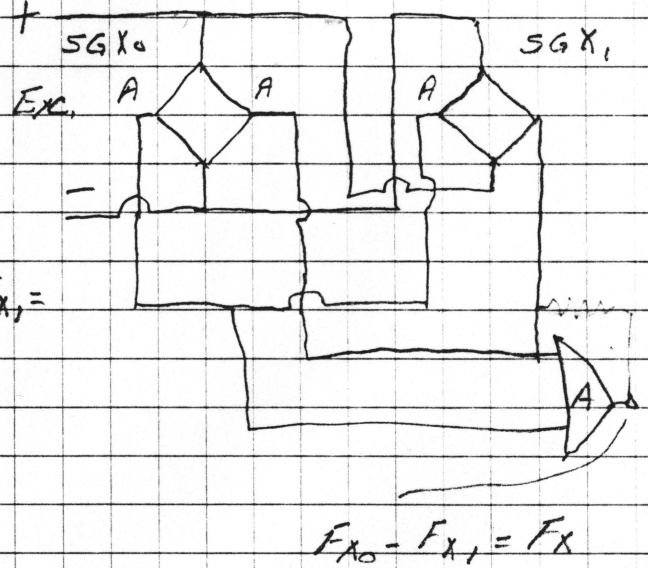


Fig. 7

A.



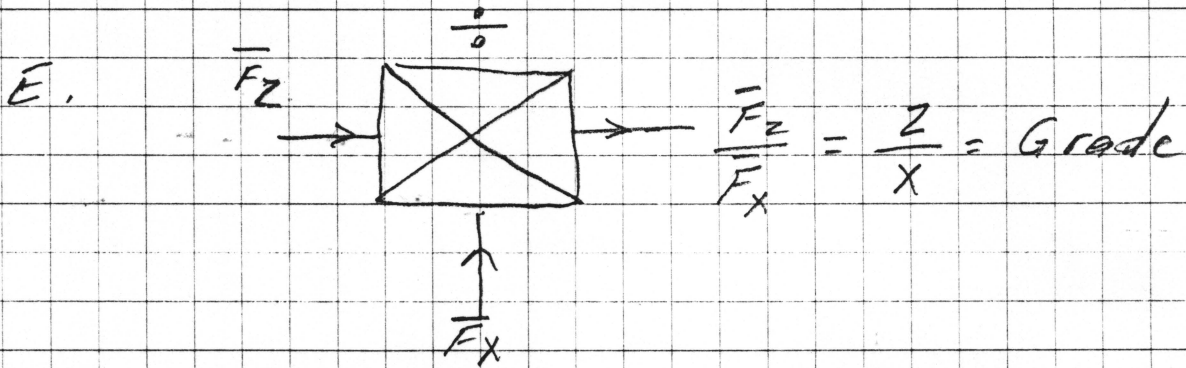
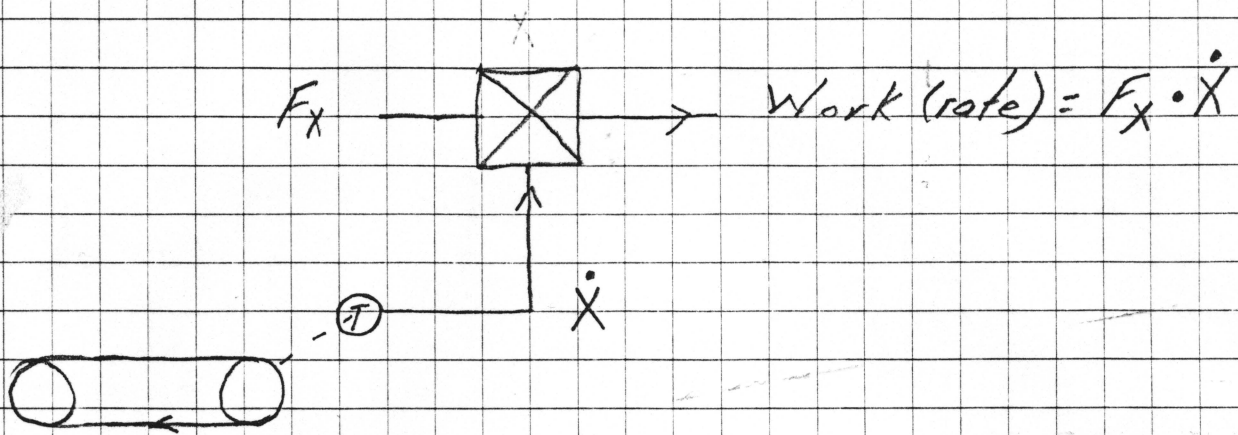
B.



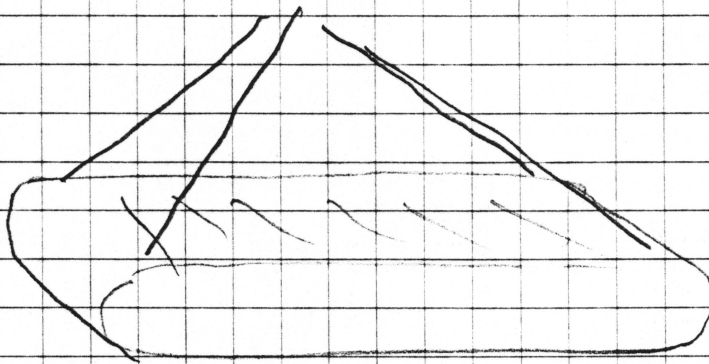
$A_1, A_2 = instrumentation$
amps
 $A_3 = analog amp$

$$r_1 = r_2 = r_3$$

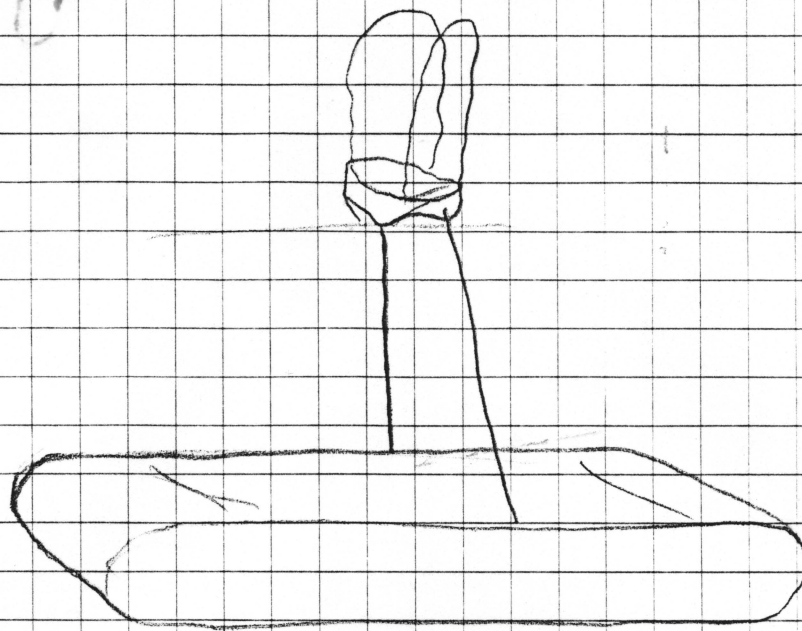
7. D



8. A



8B



9.

