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Avitan et al.

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[54] **DUAL AXIS CARRIAGE ASSEMBLY FOR A CONTROL HANDLE**

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[52] **U.S. Cl.** ..... **74/471 XY**

[58] **Field of Search** ..... 74/471 XY, 469, 74/470, 471 R

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[57] **ABSTRACT**

A dual axis carriage assembly for industrial control handles includes a base yoke fixed to a support surface and a moveable yoke to which the control handle is attached. Each yoke includes a pair of coaxial spaced bearing surfaces and journal portions of one shaft of a cross shaft assembly are received in the bearing surfaces of the moveable yoke while journal portions of the other shaft are received in the bearing surfaces of the base yoke. A torsion coil spring is carried on each shaft with the spring having a pair of parallel arms which straddle the sides of a flange projecting from the yoke within which the corresponding shaft is received. A dog, fixed to the end of each shaft includes an axial leg which is positioned between the spring arms. Rotation of each shaft relative to its yoke results in displacement of one spring arm so that the spring returns the shaft to a null position. The dog also includes two radial legs which engage the yoke flange to provide rotation limit stops. An angular displacement transducer and includes a body fixed to each yoke and a stem which is received in an axial bore of the corresponding shaft to generate a signal representative of angular displacement of each shaft with respect to a reference position.

17 Claims, 4 Drawing Sheets