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NASA TECH BRIEF

Carriage-Rail Assembly for High-Resolution Mechanical Positioning

A carriage-rail assembly for a high-resolution mechanical positioner effects extreme resolution and position accuracy with very little friction, and is applicable to such apparatus as optical benches, inspection fixtures, machine tools, and photographic equipment.

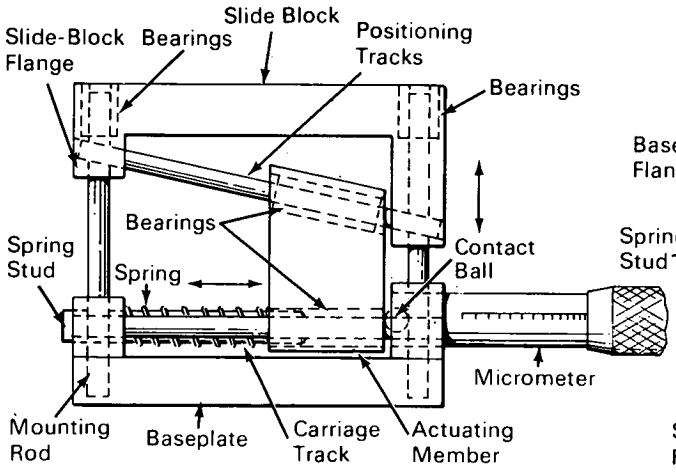

Figure 1. Side View in Elevation

The positioner has a horizontal baseplate with a vertical mounting rod pressed into each of the four corners (Fig's. 1 and 2). A slide block of roughly the same area as the baseplate has a flange at each end and, in each corner, a hole through which a mounting rod slides. Above, close to, and parallel with the baseplate is a pair of carriage tracks mounted in flanges projecting vertically from opposite ends of the baseplate. A pair of positioning tracks, at a preselected angle from the horizontal, are mounted in flanges projecting vertically downward from opposite ends of the slide block.

An actuating member is pierced by the carriage and positioning tracks along which the member slides. The member is mechanically coupled to the slide block through the positioning tracks which are inclined at a preset angle relative to the horizontal carriage tracks. Thus, horizontal positioning of the actuating member vertically adjusts the position of the slide block relative to the actuating member and the baseplate. A coiled

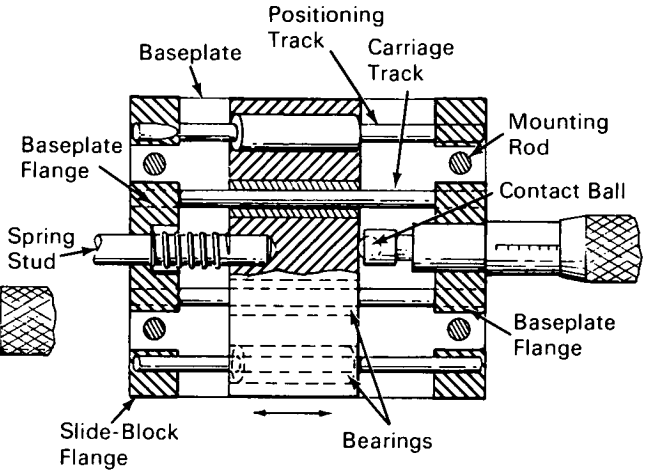

Figure 2. Plan Multisectional View

compression spring around a stud and between the baseplate flange and the actuating member keeps the latter in permanent contact with the steel ball in the end of a micrometer element, ensuring accuracy in the movement of the member.

The height of the slide block is adjusted by rotating the micrometer. The ratio of the horizontal movement of the actuating member to the vertical movement of the slide block depends on the selected angle of inclination of the positioning tracks. With the angle at 45 deg, the ratio between the two motions is 1.0. As the angle approaches zero, the ratio approaches infinity. With the angle at 11 deg 30 min, for example, the slide block's vertical motion is 0.200 in. for each 1.000 in.

(continued overleaf)

of horizontal motion of the actuating member (and the micrometer element).

Note:

Requests for further information may be directed to:

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Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to:

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