NASA TECH BRIEF
Ames Research Center

Universal Inverted Flexure

The problem:

To provide a frictionless, inverted universal pivot (two angular degrees of freedom about a common point) which minimizes the effect of temperature changes and prevents overstressing of the flexing elements.

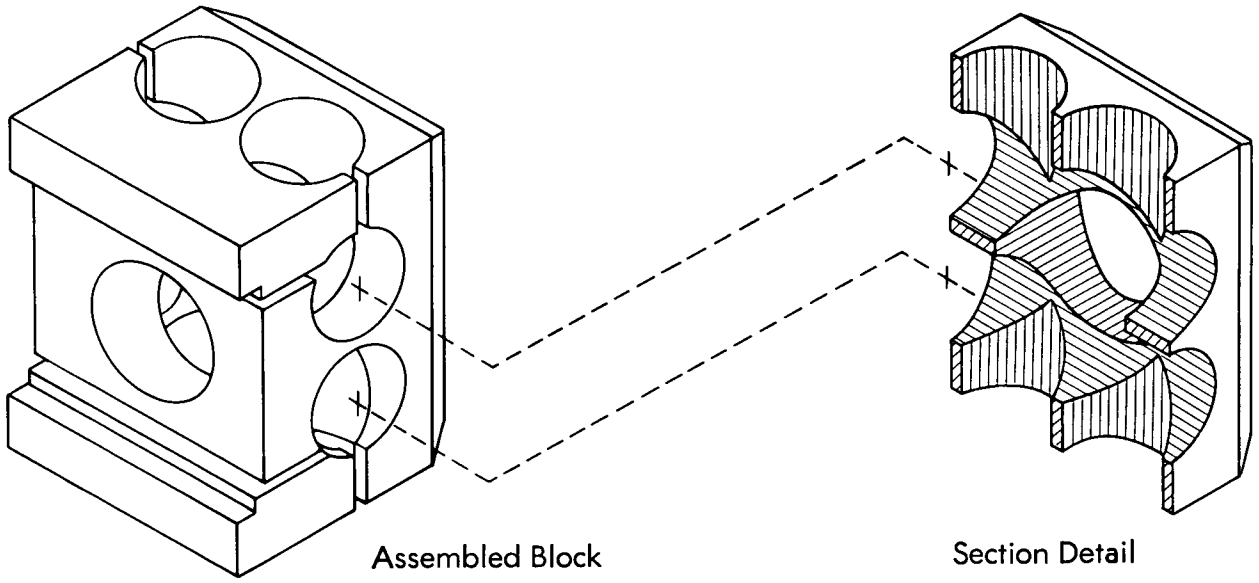
The solution:

A flexure block which can be readily fabricated from a single piece of material.

How it's done:

A block is first machined with external surfaces as shown in the diagram. Then the single side hole and the vertical holes are bored through the block, and the four side holes are bored just deep enough to intersect the center line of the through-holes. The device maintains stiffness during boring operations so that accuracy is easily achieved without special restraining fixtures.

Finally, 6 saw cuts are made to free the flexing elements; because of their width, they also provide the limits of motion, that is, they are inherent limit stops.



Assembled Block

Section Detail

The device is symmetrical about the third (non-flexing) axis; hence, thermal expansion and contraction will not displace the flexural center from this axis. For this reason, a body suspended from this device will undergo negligible angular change in position because of changes in temperature, without regard to the material of which the device is fabricated.

The device is intended for inverted use, input and output on the same side. However, it can easily be

(continued overleaf)

used in a normal, noninverted configuration by attachment to the innermost block through the counterbored portion of the single side hole.

Note:

Requests for additional information may be directed to:

Technology Utilization Officer
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Reference: TSP72-10122

Patent status:

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

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