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Brief 71-10034

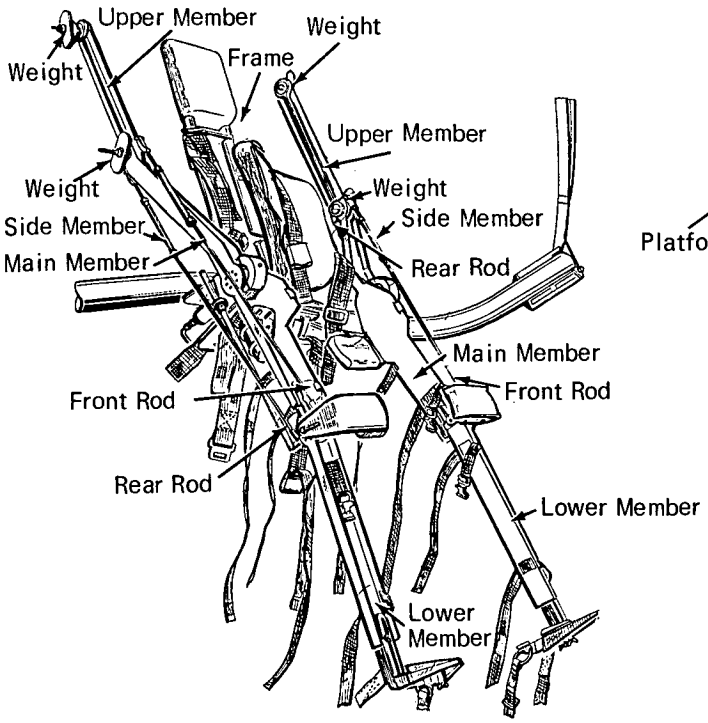
NASA TECH BRIEF

Marshall Space Flight Center

Zero-G Simulation System for Therapeutic Application

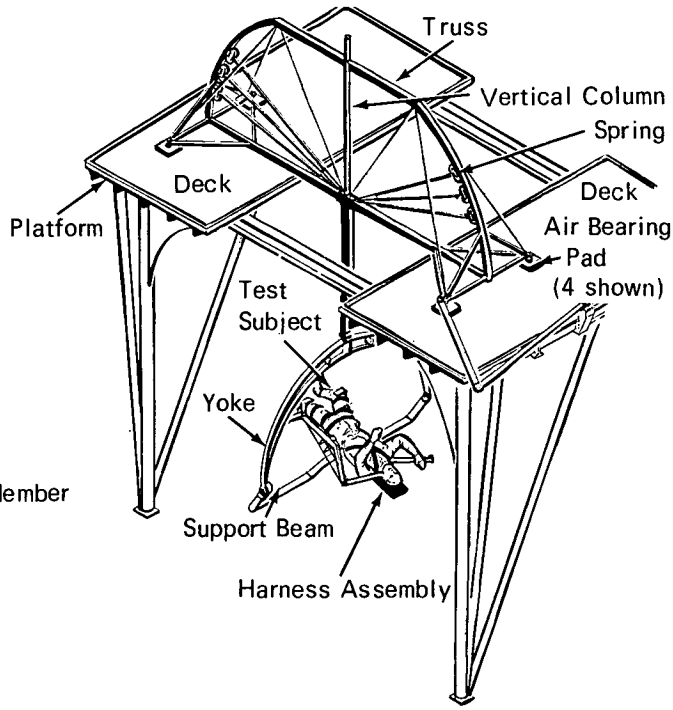
The problem:

Design a system for use in the therapeutic retraining of damaged muscles, or as a walking support during the therapy. The system should effectively counterbalance external forces exerted on the patient.



How it's done:

The zero-G simulation mechanism is mounted on a platform secured to the floor. The platform contains two separated decks and a truss which spans the separation and is supported on the decks by air bearing



The solution:

The zero-G simulation system consists of an articulated harness assembly for containing the patient, and a suspension system for supporting the harness assembly in such a way as to counterbalance the exertion of external forces on the patient.

pads. A sliding vertical column extending down through the separation is suspended from the truss. At the lower end of the vertical column is a center-journaled semicircular yoke to which a free rotating support beam is mounted. The harness assembly is secured to a plate mounted midway on this support

(continued overleaf)

beam. Special constant-force springs are attached between the truss and the vertical column to counterbalance the weight of the column and its load.

The articulated harness assembly design permits the upper limbs to counterbalance the lower limbs, creating an interaction similar to that of walking. The assembly is composed of a frame for supporting the head and back of the patient, and two pivoting articulated side members, one on each side of the frame at the approximate location of the patient's hips. Each side member contains a main member, an upper member, and a lower member, all connected by pivot joints. The upper and lower members on a side are connected with front and rear rods so that, when the patient pivots, the lower member (strapped to his leg) and the upper member (strapped to his arm) pivot in opposite directions. Weights are attached to the uppermost ends of the main members and the upper members to effectively counterbalance the weight of the patient's legs and the attaching harness.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B71-10034

Patent status:

This invention has been patented by NASA (U.S. Patent No. 3516711), and royalty-free license rights will be granted for its commercial development. Inquiries about obtaining a license should be addressed to:

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