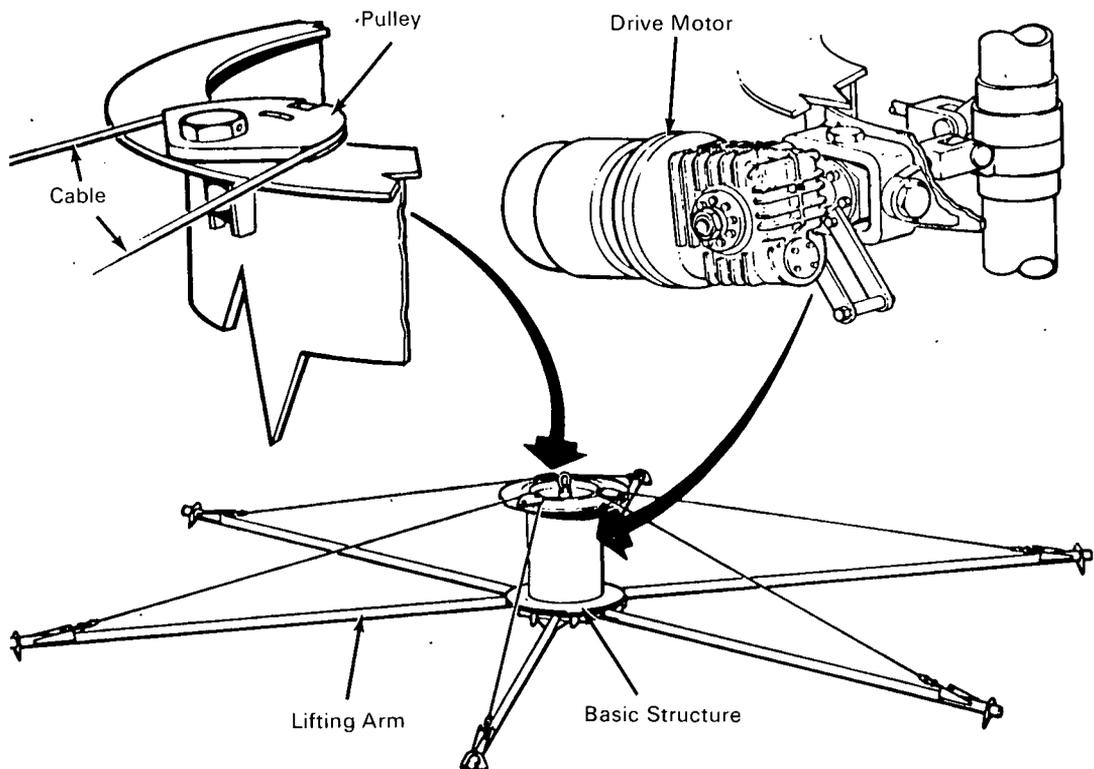


NASA TECH BRIEF



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Automatic Leveling and Equalizing Hoist Device



The problem:

In lifting large cylindrical objects, prior methods have used rigid 4-way or 6-way spreader bars requiring the use of ballast for leveling. This does not equalize stress on the hoisted load and, in fact, makes possible support of the entire load on one spreader bar (2 points) rather than equally distributing the load.

The solution:

A hoist using six equally spaced support points with the load equalized between pairs to prevent over-

stressing of any one point of support. The pickup point is automatically shifted through a motor-driven feedback system to level the load throughout the lifting period.

How it's done:

The basic hoist structure is a vertical 24-in. diameter tube mounting six equally spaced arms free to pivot vertically but held rigid laterally. On the top of the tube are three pulleys, one between each adjacent pair of the six arms. A cable over each of these pulleys

(continued overleaf)

is attached to the ends of the adjacent arms, thereby equalizing the support and lift capabilities for each arm of the pair. A spherical bearing, mounted on the inside center line at the bottom of the basic tube, supports the hoisting arm which has an eye at its top to receive the hook of the lifting crane. Two screw jacks (worm gears) are attached to the hoisting arm at 90° to each other, and, by means of reversing gear motors move the hoisting arms laterally to achieve a centered balance for the hoisting. A pendulum device mounted on the basic structure acts as a servo to sense an out-of-level condition and actuate the gear motors to bring the hoist to a true level condition.

Note:

Requests for further information may be directed to:
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Reference: TSP69-10514

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No patent action is contemplated by NASA.
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