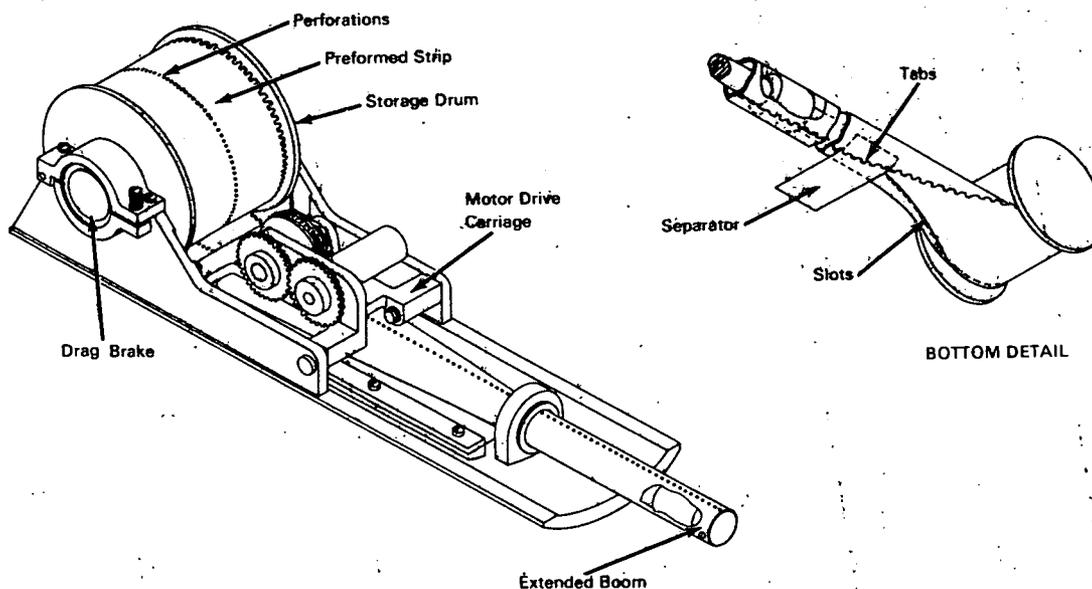


NASA TECH BRIEF



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Sheet Metal Strip Unrolls to Form Circular Boom



The problem:

To develop a retractable boom which can be extended for use as spacecraft antennas, gravity-gradients, and positioning devices.

A previous retractable boom (described in Tech Brief 64-10111, May 1964) was made from a strip of beryllium copper preformed into a cylindrical shape which was opened flat and wound on a storage drum. When unrolled from the drum, the beryllium copper strip would assume its preformed shape. The boom lacked torsional and flexural rigidity because it had a longitudinal slit that prevented the formation of a continuous circular cross section.

The solution

A strip of metal that has a preformed cylindrical shape with tabs and slots on opposite edges. The strip is opened flat and coiled on a storage drum. When the strip is unrolled from the drum, the tabs interlock with the slots to form a cylindrical boom having a continuous circular cross section.

How it's done:

The preformed strip is pulled off the drum by means of a sprocket feed mechanism. As the strip is pulled off the drum, it resumes its circular cross-sectional shape and engages a mandrel that ensures that the

(continued overleaf)

tabs enter and lock with the proper slots on the adjacent edge. A separator is used to place the tabs on the outside of the slots. The sprocket drive mechanism pulls the strip off the drum by means of a sprocket wheel that engages perforations in the center of the strip. The drum has a slight braking force applied to it so that the strip is pulled off under tension.

Notes:

1. The continuous circular cross section of the extended boom gives it torsional rigidity, bending strength, and orientation predictability.
2. Related innovations are described in Tech Briefs 63-10200, May 1964, and 65-10191, June 1965.

Inquiries may also be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland, 20771
Reference: B66-10032

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code AGP, Washington, D.C., 20546.

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