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Marshall Space Flight Center



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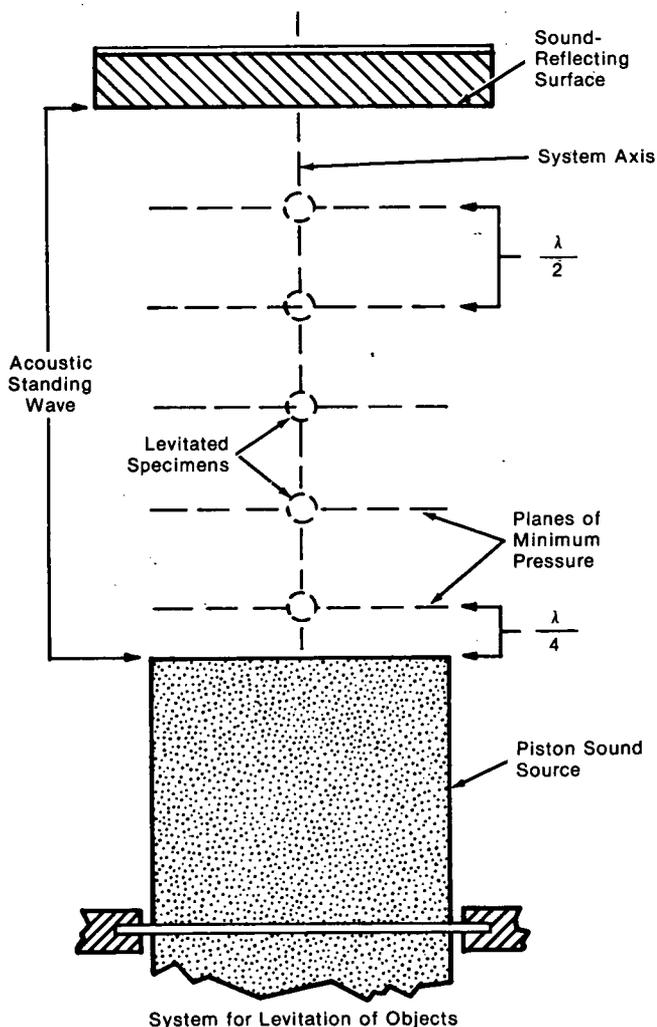
Levitation of Objects Using Acoustic Energy

A new system incorporates acoustic energy to levitate objects in air. The system can be used to handle liquid and solid objects without containers.

Basically, the system (see figure) includes a sound source and an acoustic reflector. The reflector is installed at a distance $n\lambda/4$ away from the source, where λ is the wavelength of the acoustic signal and n

is an integer. The gap between the source and the reflector is defined as the Fresnel region.

When the source is turned on, a standing-wave pattern is established in the Fresnel region. A solid or liquid material introduced into this region will move to one of the low-pressure areas produced at the standing-wave antinodes. It will remain suspended as long as the acoustic signal is present.



System for Levitation of Objects

(continued overleaf)

The suspended object is also stable horizontally. This stability is provided by a near-field pressure pattern of the waves. Similar pressure patterns are formed horizontally in the vicinity of the antinodes. Their action is similar to that of the vertical wave pattern. The minimized pressure points are formed as concentric circles laid horizontally around the system axis. The suspended object rests at one of these circles a fixed distance away from the axis.

Note:

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Patent status:

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