

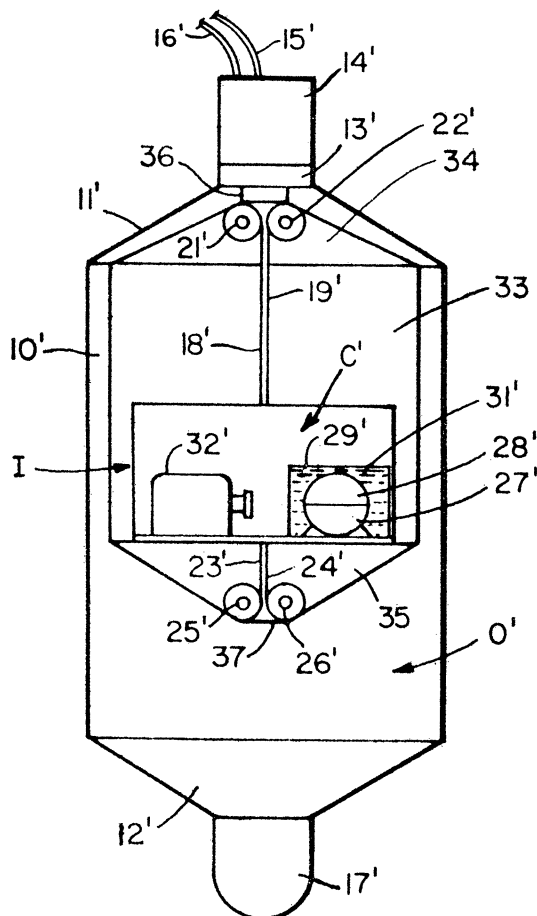
Current Patents

SPACE SIMULATION

Free-fall Test Tower

In Denver, Colo., space scientists are dropping packages down a converted Titan missile silo to learn something about how liquids such as rocket fuel behave in space. The falling package provides 2.16 seconds of the most valuable commodity on earth for space testers: weightlessness.

But that's the easy part. In a satellite or space vehicle, the weightless fuel is occasionally subjected to miniscule forces, perhaps as small as a thousandth of earth's gravity, due to the movements of the spacecraft. These



forces can be enough to counteract the capillary action that keeps the fuel flowing when the rocket motor is firing. This is the problem being studied by the Martin-Marietta Corp., three of whose scientists have just been granted a patent for their unique free-fall test facility.

Within the package as it falls down the silo is a smaller package, within which are the test equipment and a movie camera to record the test. To produce a slight g-force, or acceleration, during weightlessness, the inner package is first fastened to the floor of the outer one. Once the outer package is dropped, a catch is released, and a precisely-measured spring pulls the inner package upward, producing a tiny force on the weightless experiment. To simulate negative gravity, or deceleration, the inner package is mounted to spring downward from the "ceiling."

Martin's "negator spring" technique is much simpler

than the elaborate and expensive gas jets used at the National Aeronautics and Space Administration's Ames Research Center in California. Possibly as a result, NASA is supporting some research in the Martin facility.

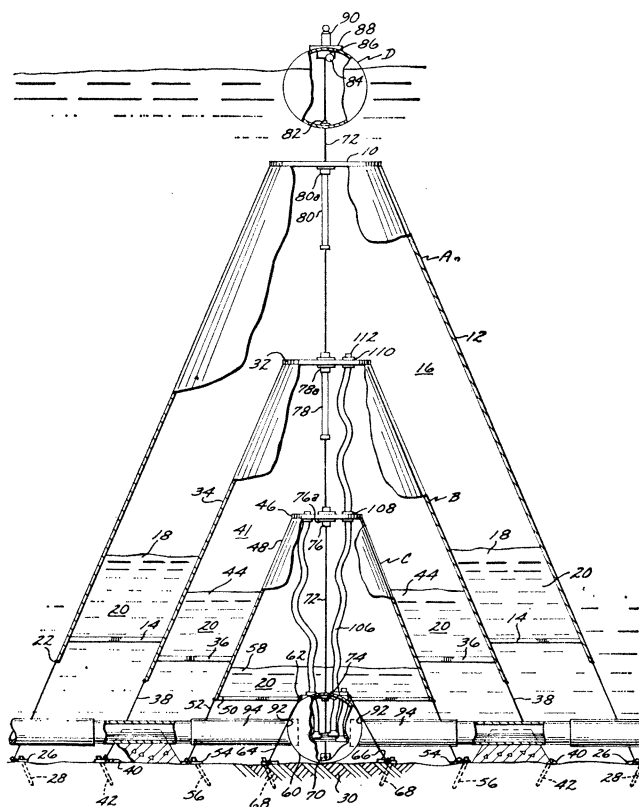
PATENT: 3,339,418

MARINE TECHNOLOGY

Undersea Chemical Storage

A familiar sight around the country, particularly in coastal areas, is the vast forests of storage tanks used by the petroleum and chemical industries. Unfortunately, the tanks are often located on land that could be valuable for many other purposes besides "dead storage." In addition, says inventor Gilbert Siegel of Garden Grove, Calif., they are an eyesore and can pose fire and explosion hazards.

The solution, he says, is to store the materials on the ocean bottom. To do this, Siegel has designed a storage



unit that consists of a series of cones, stacked points-up. The unit would only be used for substances, such as oil, that are lighter than water, so the cones would have no bottoms, and would simply be tied down on the ocean bottom, one above the other. Water pressure would keep the chemicals up inside the cones.

Either the same or different chemicals could be stored beneath the different cones, and additional material being pumped in would simply displace more water. Besides being relatively immune to ground shocks, high winds, waves, typhoons and the like, according to Siegel, the storage unit would also greatly reduce the distance over which the chemicals would have to be pumped when loading and unloading a ship.

PATENT: 3,339,512