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Brief 71-10312

NASA TECH BRIEF

Goddard Space Flight Center

Instrument Detects Bacterial Life Forms

A self-contained biochemical analysis instrument automatically performs the chemical operations required for the detection of life by assaying the enzymatic bioluminescent reaction that occurs when adenosine triphosphate (ATP) is combined with luciferase and luciferin. ATP is universally present in all living matter, making it an excellent indicator of various life forms, e.g., bacteria.

The module block of the device contains a reaction and an extraction chamber coupled together by a small passage. Distilled water, stored in the lower part of the extraction chamber, is directed through the passage to dilute the enzyme stored in a glass ampoule in the upper part of the reaction chamber. A second opening connecting the two chambers permits the injection of the sample into the reaction chamber.

During operation of the unit, a measured quantity of the sample is deposited into the module. External actuators are then used to move the pistons in sequence, thereby transferring the sample into the reaction chamber and crushing the ampoule to release the enzyme. A photomultiplier detector, mounted on the optical window at the bottom of the reaction chamber, measures the light emitted from the bioluminescent reaction, and this quantity of light is correlated to the bacterial count.

The module assembly represents a unique approach to multiple-sample assay instruments in that it minimizes the need for valves, pumps, tubing, solenoids, and other hardware associated with the transfer of reaction fluids and waste. The module assembly can be used for chemical assay reactions encountered in marine biology, aerospace, and medical fields.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Code 207.1
Greenbelt, Maryland 20771
Reference: B71-10312

Patent status:

No patent action is contemplated by NASA.

Source: C. Plakas of
Biospherics Research, Inc.
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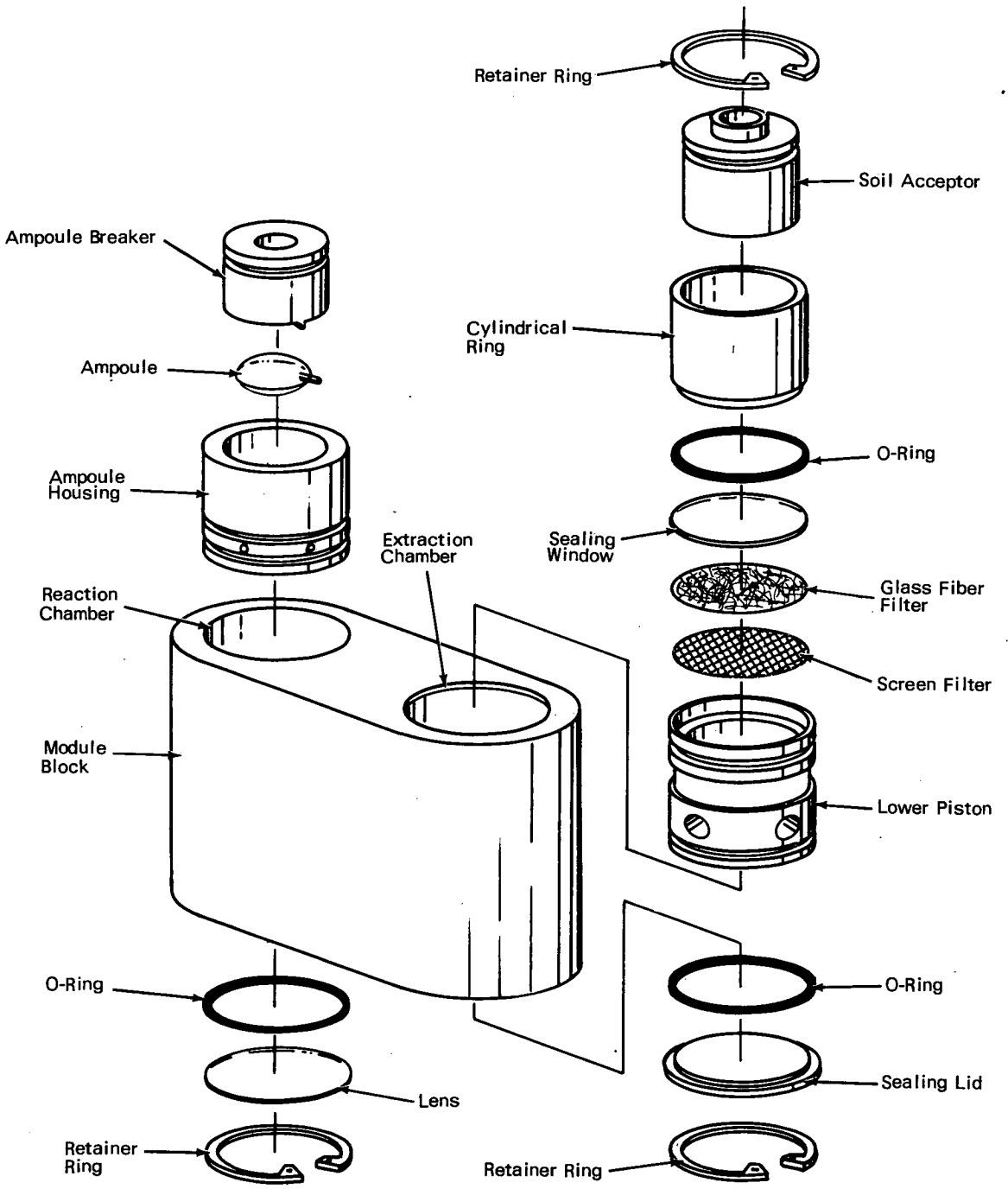
(continued overleaf)


Retainer Ring
Soil Acceptor
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Ampoule Housing
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Glass Fiber Filter
Reaction Chamber
Screen Filter
Module Block
Lower Piston
O-Ring
O-Ring
Lens
Sealing Lid
Retainer Ring
Retainer Ring