September 1972 B72-10581

NASA TECH BRIEF

Lewis Research Center

Improved Silver-Zinc Battery-Terminal Seals

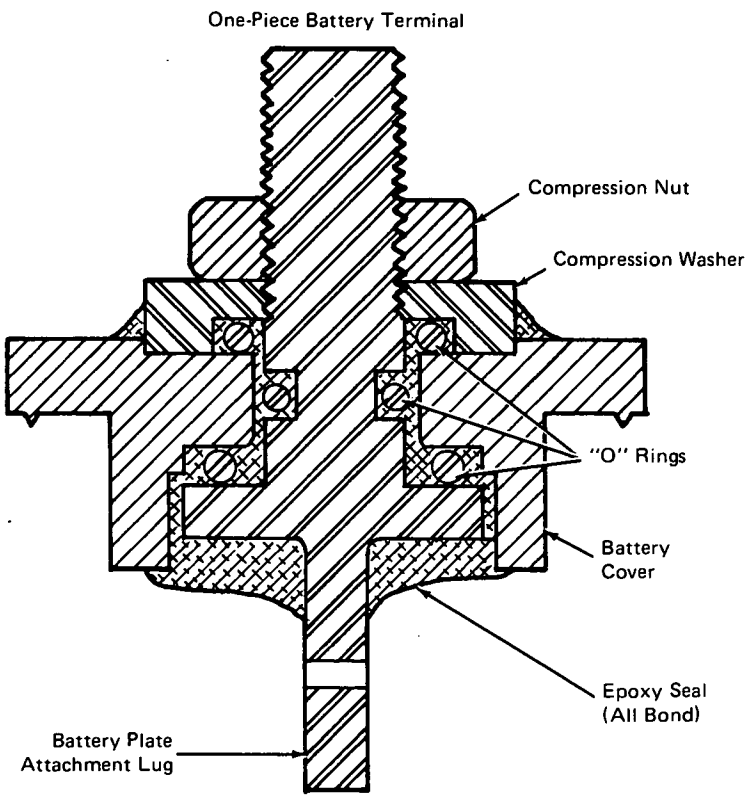

Figure 1.

The problem:

To develop a battery terminal seal capable of sealing an electrolyte for long time periods (3-5 years) with zero leakage. Present terminal seals, such as shown in Figure 1, develop leaks after a relatively short time (approximately nine months), thus limiting battery operating life.

The battery terminal seal integrity must be maintained under the operational voltage, a vacuum, and temperature cycling from 21 to 60°C (70 to 140°F).

In present terminal designs, a single-piece unit with three "O" rings is potted with an epoxy, assembled in the battery cover, and further potted at the interior and exterior ends. Failure by electrolyte migration has been experienced with all such terminals in plastic battery cases built to date.

The solution:

Eliminate electrolyte migration paths to the outside by the use of a two-piece battery terminal having only internal threads and no epoxy potting internal to the seals.

(continued overleaf)

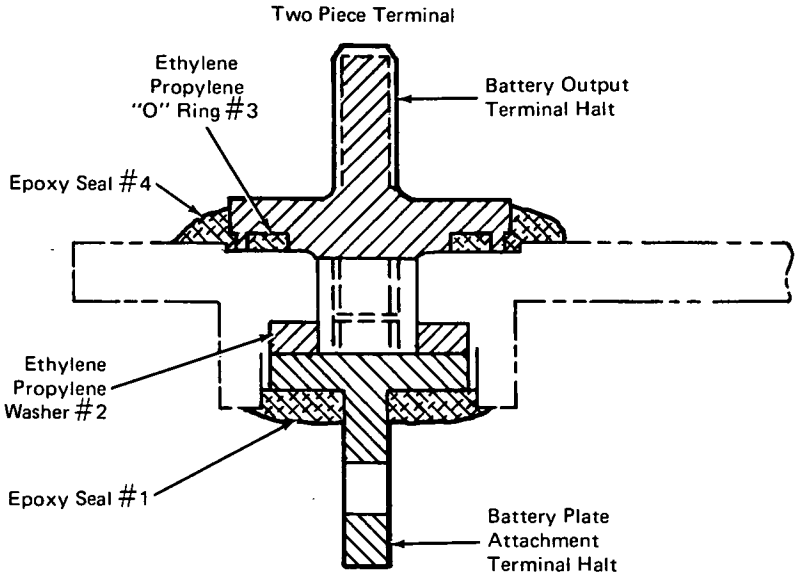

Figure 2.

How it's done:

The terminal was fabricated in two pieces (Figure 2). The design provides four separate sealing barriers: (1) an interior-end epoxy seal, (2) an elastomeric flat washer under compression, (3) an ethylene propylene "O" ring also under compression, and (4) an exterior epoxy seal. For leakage failure to occur, the ions must migrate through three annuli formed by four different seals. The seals comprise three different sealing methods.

Batteries with these redesigned terminal seals have been placed in various positions and subjected to thermal cycling with no signs of the potassium hydroxide electrolyte leaking through the terminals after 21 months of testing. Tests are continuing. These terminal seals can be used for other types of long-life alkaline batteries, and it is planned that these seals will be used in other battery systems.

Notes:

1. The following documentation may be obtained from:
   National Technical Information Service
   Springfield, Virginia 22151
   Single document price $3.00
   (or microfiche $0.95)
   Reference: NASA TM-X-68067 (N72-24051), Nonleaking Battery Terminals
2. Technical questions may be directed to:
   Technology Utilization Officer
   Lewis Research Center
   21000 Brookpark Road
   Cleveland, Ohio 44135
   Reference: B72-10581

Patent status:

Inquiries concerning rights for the commercial use of this invention should be addressed to:

Patent Counsel
Mail Stop 500-311
Lewis Research Center
21000 Brookpark Road
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