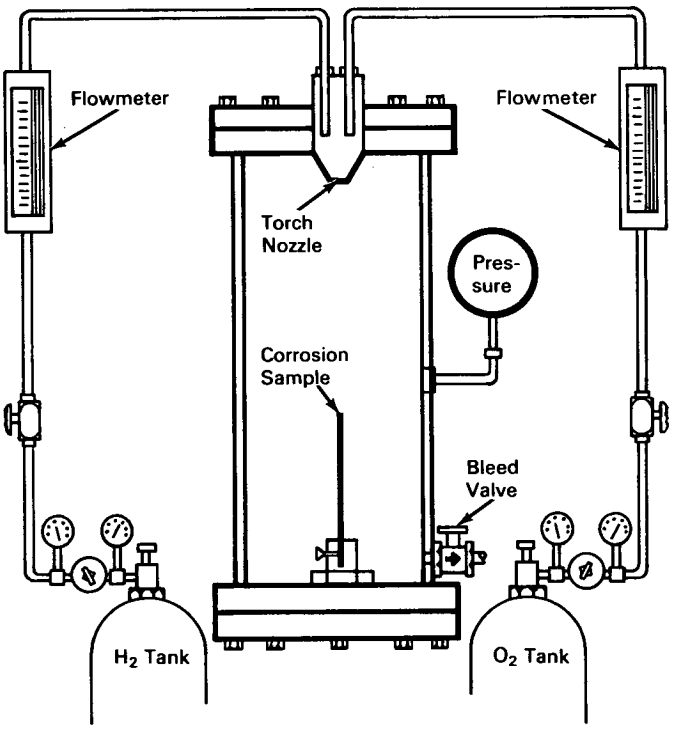
NASA TECH BRIEF

Oxygen-Hydrogen Torch is a Small-Scale Steam Generator



The problem:

Corrosion-rate analysis of various metals frequently requires the use of steam at high temperatures and pressures. Water-boiling steam generators are cumbersome, expensive, pose safety problems, and permit little or no flexibility in oxygen or hydrogen content control.

The solution:

A standard oxygen–hydrogen torch that generates steam through local combustion inside a test chamber under constant temperature and pressure control.

How it's done:

The torch nozzle is sealed into one end of the test chamber. Oxygen and hydrogen are metered to the torch in the desired ratio and ignited by a conventional spark source. Discharge from the test chamber is regulated by a bleed valve to maintain desired chamber pressure. Test chamber walls are hollow for heating or cooling through a wide temperature range. The sample under test is held in a simple mount at the bottom of the chamber directly in the path of the nozzle discharge.

(continued overleaf)

Notes:

1. Chamber pressure can be as high as 2,000 psig with torch gas flow rates of 0.1 to 1.0 standard cfm.
2. This system has been used successfully in corrosion-rate measurements of stainless steel at 500° F with various oxygen-to-hydrogen ratios.
3. Although the system was used for corrosion-attack studies, it is apparent that single or coupled torches can be employed to generate limited quantities of steam in a variety of applications.
4. Particular care must be exercised to prevent explosions in thin-wall chamber configurations, or where personnel or other hazards may exist. Designs should assure (a) pre-ignition purging, (b) optical viewing of the nozzle area, (c) the existence of a continuous ignition spark at the nozzle prior to the start of gas flow.
5. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   AEC-NASA Space Nuclear Propulsion Office
   U.S. Atomic Energy Commission
   Washington, D.C., 20545
   Reference: B66-10120

Patent status:

No patent action is contemplated by NASA.

Source: C. E. Maskell
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