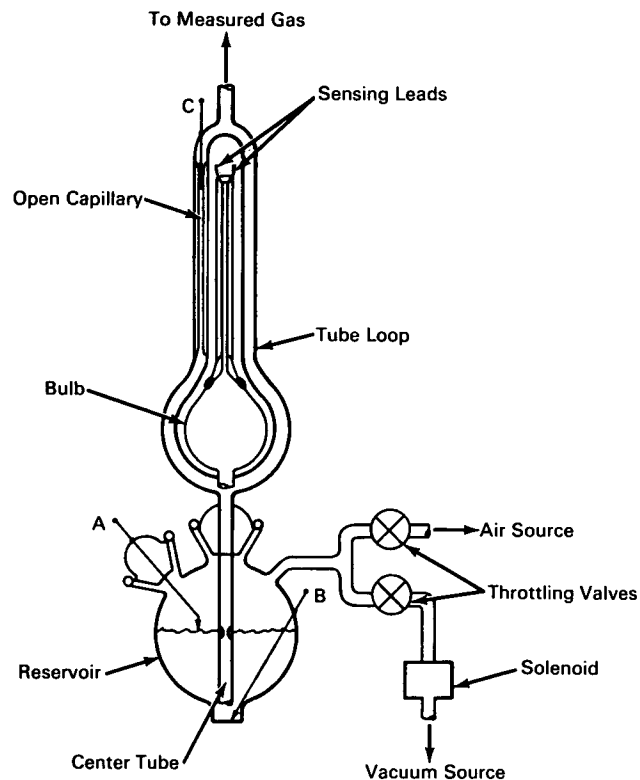


NASA TECH BRIEF



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Modified McLeod Gage Records Automatically



The problem:

When measuring pressures with a conventional McLeod gage, an operator must be constantly in attendance and must record the measurements by hand.

The solution:

A modified McLeod gage that records measurements automatically. Measurements can be programmed in advance by means of an automatic timer.

How it's done:

The system consists of the gage, an air/vacuum pumping device, and appropriate circuitry to cycle the pumping device. The gage is a modification of standard McLeod type and indicates the pressure of a gas by the change in resistance of two platinum wires, contacted by a column of mercury as it is acted on by the measured gas.

(continued overleaf)

In operation, with the mercury level as shown in contact with valve leads A and B, the solenoid valve in the vacuum source line is closed. This permits air from the air source to enter the gage and force the mercury upward through the center tube into the tube loop and bulb. This breaks the contact between leads A and B but a latching relay in the control circuitry retains the solenoid valve in the closed position. When the mercury reaches the upper portion of the open capillary and contacts lead C, a circuit is closed between leads C and B that deenergizes the latching relay in the control circuit to energize the solenoid and connect the reservoir with the vacuum source. The vacuum source has sufficient capacity to override the air source and causes the mercury to recede into the reservoir. The solenoid valve remains open until the mercury surface in the reservoir again contacts lead A, at which time the solenoid valve closes and the cycle repeats. Cyclic period is controlled by adjustment of the two throttling valves.

As the mercury rises during the test cycle, it enters the capillary that is closed at the top and forms a bridge network with the two platinum wires that are connected to a constant voltage source and the recording circuitry. Mercury entering the closed capillary is

limited by the density of the measured gas it is compressing. The change in resistance of the platinum wires is recorded as a voltage output change that directly relates to the pressure of the measured gas.

Notes:

1. This method of using a standard McLeod gage lends itself to a wide variety of applications. Some systems operating the vacuum solenoid could be controlled by pressure, temperature, and time sensing devices.
2. Inquiries concerning this invention may be made to:

Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135
Reference: B66-10290

Patent status:

This invention is owned by NASA and a patent application has been filed. Royalty-free, non-exclusive licenses for its commercial use will be granted by NASA. Inquiries concerning license rights should be made to NASA, Code GP, Washington, D.C. 20546.

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(Lewis-290)