Journal of Chromatography, 179 (1979) 176–178

CHROM. 12,134

Note

A simple electromechanical peak or trough detector

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(First received March 26th, 1979; revised manuscript received June 20th, 1979)

It is sometimes necessary to operate recording or measuring circuits at the peak for a component eluted from a gas chromatograph. Expensive electronic equipment is available for this purpose, but frequently requires modification to eliminate spurious maxima caused by noise on the recorder trace or from external electrical circuits. Fig. 1 shows a simple electromechanical system for use with a linear pen-carriage guide, which can be adapted for use with most potentiometric chart recorders. An additional idler carriage is fitted to the guide-rail along which the pen carriage runs (Fig. 1), and is pulled along by a contact bar (C) fitted to the pen carriage. As the signal increases, the contact bar is pulled against a contact screw (A), and this allows the capacitor to be charged from the battery or power unit. As soon as the signal starts to decrease, the contact bar is pushed on to the second contact screw (B), allowing the capacitor to discharge through the relay operating the secondary circuit. Premature operation due to noise can be prevented by increasing the gap between the two contact screws.

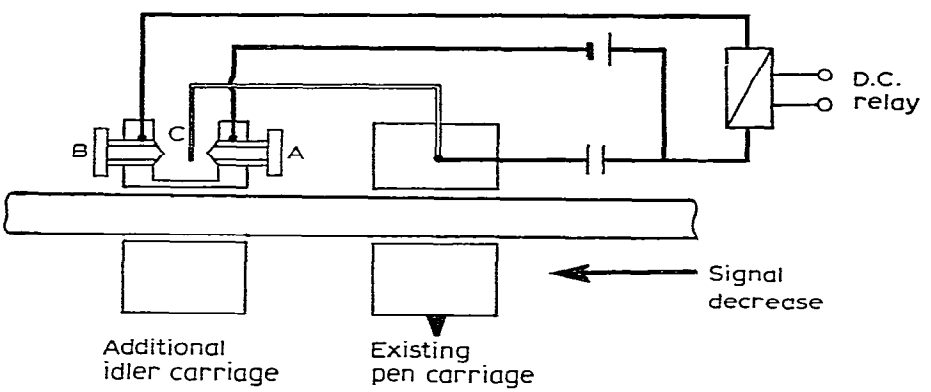

Fig. 1. Schematic diagram of peak detector.

This system has been adapted for use with a Leeds & Northrup Speedomax recorder, which has a circular slide-wire and central spindle. Discs carrying the

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appropriate contacts are fitted to the central spindle as shown in Fig. 2. A striker pin on the drive plate (D) corresponds to the contact bar of Fig. 1, and adjustable contacts on plate E correspond to the contact screws. An additional disc (F) acts as a cam to control microswitches, which prevent operation at peaks higher or lower than the one of interest. Discs E and F are connected by a ball-race, which allows them to move freely together about the recorder spindle. A frictional damper is spring-loaded against discs E and F to steady the movement at the peak. The device has been operating successfully for some time as part of an automated ^{15}N analyser[1]. In this instrument, nitrogen is produced by catalytic decomposition of ammonia, and gas chromatography is used to separate the nitrogen from the hydrogen. At the nitrogen elution peak, the optical system measures the ratio of the intensities emitted by $^{15}N^{14}N$ and $^{14}N^{14}N$ at 298.3 and 297.7 nm, respectively.

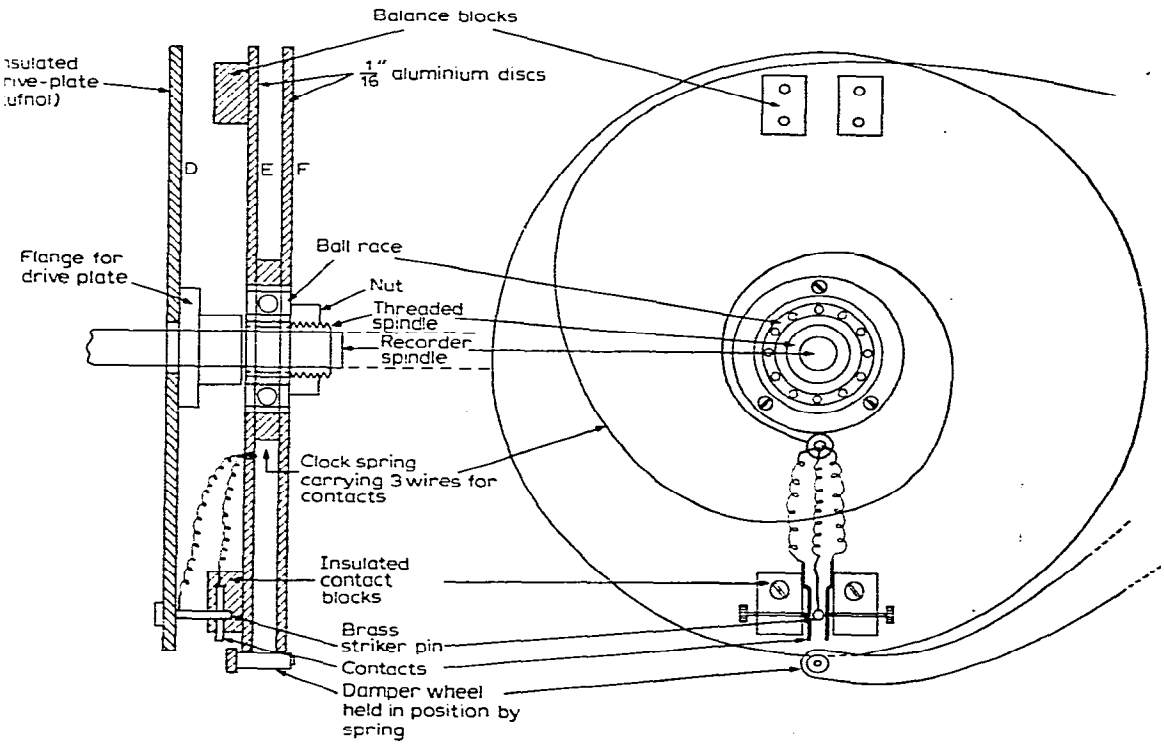

Fig. 2. Principle of the peak or trough detector adapted for use with a recorder having a circular slide-wire.

The detector may also be adapted for use as a trough detector by reversing the battery and relay positions. In this instance, the capacitor charges as the signal decreases and is not discharged until the signal begins to increase again as a new peak appears. Such a mechanism is useful to operate the switching of a fraction collector so that effluent corresponding to a single peak is collected in one tube. A timing device may also be included so that collection of effluent does not continue after the whole peak has been eluted, thereby avoiding unnecessary dilution of the

fraction. A trough detector of this type has been operating successfully for more than 1 year on an automatic amino acid analyser used to prepare amino acid fractions from protein hydrolysates for ^{15}N analysis.

ACKNOWLEDGEMENT

We thank the NIRD Instrumentation Section workshop for help in the construction of this device.

REFERENCE

1 J. D. S. Goulden and D. N. Salter, *Analyst (London)*, 104 (1979) 756.