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A new design for a continuous double sample applicator for liquid chromatography

In an earlier paper a sampling apparatus for amino acid analysis was described¹. After long experience with this apparatus a new design has been developed suitable for continuous sample application. Figs. 1 and 2 give illustrations of the design. The principles are the same as described in the earlier paper. The new model, however, is circular, which permits application of the sample into each sample loop when an



Fig. 1. Top view of the apparatus. 1 = cross beam; 2 = sample applicators.

amino acid analyzer is in operation. Another new feature is the possibility of simultaneous sample application on two different columns. In this way the same sample can be applied onto the long and short column in a two column amino acid analyzer system²⁻⁴. The double sample application is possible on account of the large cross beam (1, Fig. 1). Four single sample applicators are present (2, Fig. 1). Fig. 3 shows the application of the apparatus in a two column system.

Technical details

(a) *Sample applicators.* Fig. 4 gives a cross section of the sample applicator. The strength of the spring is selected empirically.

(b) *O-rings.* Two O-rings, Parker size 003 and 004, were chosen. O-ring 003 is for the inside sample applicator and O-ring 004 is for the outside sample applicator.

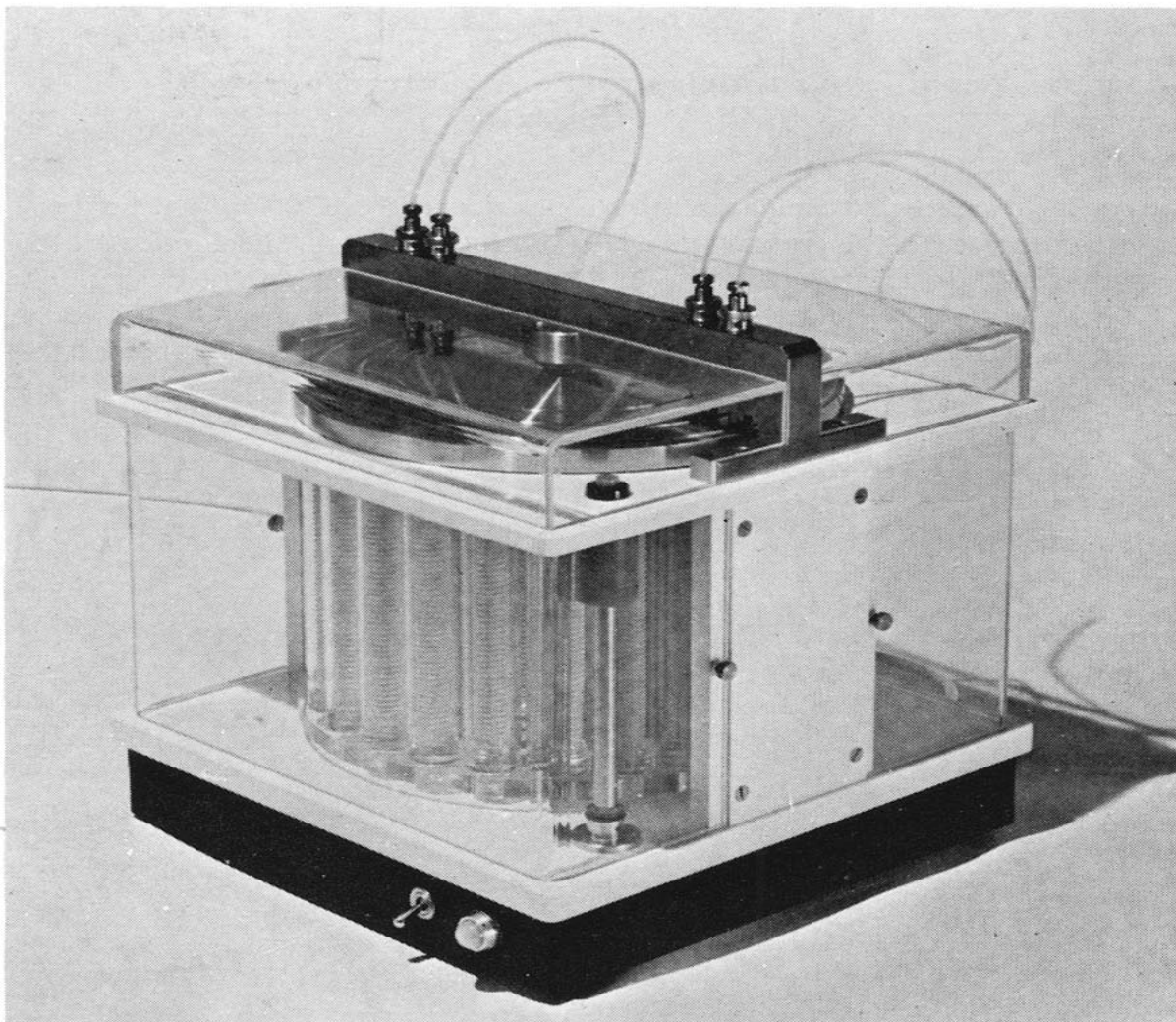


Fig. 2. Full view of the apparatus.

Two different sizes of O-rings were chosen since the distance travelled by the outside gates of the sample loops is larger than the distance travelled by the inside gates. The radii from the centre of the sample plate are respectively 10.4 and 8.4 cm.

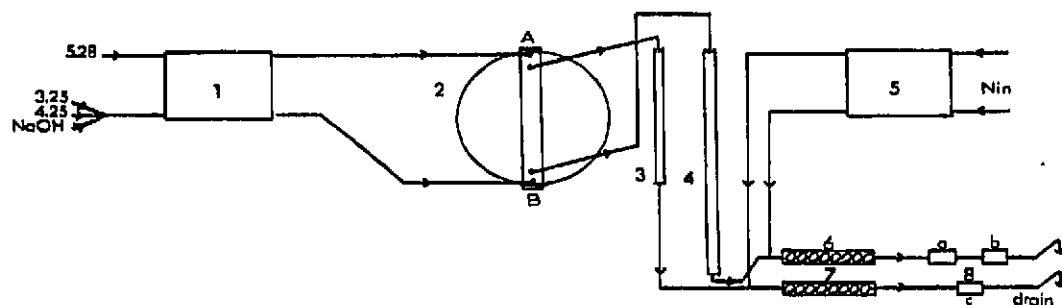


Fig. 3. Diagrammatic scheme of the sampling apparatus in a two column system. 1 = double buffer pump (e.g. Milton Roy 2196.31); 2 = sample applicator (A and B are the two sampling places); 3 = short column; 4 = long column; 5 = double ninhydrin pump; 6 = reaction coil for long column; 7 = reaction coil for short column; 8 = colorimeters. The signals from the colorimeters are recorded with a three channel recorder.

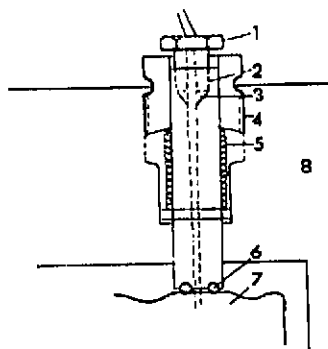


Fig. 4. Sample applicator. 1 = port screw; 2,4, screw thread; 3 = teflon ferrule; 5 = spring (force approx. 3 kg); 6 = Viton O-ring, Parker size 003 or 004; 7 = sample plate; 8 = cross beam.

(c) *Sample loops.* 24 sample loops can be coupled to the sample plate.

(d) *Drive of the apparatus.* The drive of the apparatus consists of a Berger motor RSM 64 with a reduction gear mechanism, giving a velocity of one sample loop ($1/24 \times 360^\circ$) in 3 sec.

(e) *Ratchet mechanism.* A combination of a 24-fold interruptor with a micro-switch and relays was used. A pulse activates the relays; the sample plate starts to turn; the microswitch takes over; the relays cut out; the microswitch cuts out and the motor stops immediately.

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