

A device for spraying paper chromatograms

Various methods have been tried in order to find appropriate and time-saving procedures for large series of paper chromatographic analyses. A variety of chromatographic solvent systems must often be used for the identification and recording of substances from plant extracts, metabolic products from living organisms, substances from culture media of microorganisms and when testing organic syntheses or when examining pharmacological preparations as to their quality and purity. In order to establish more reliable characteristics for the substances in question, it is in most cases necessary to use several chromatographic solvent systems, as well as a number of more or less selective colour reagents when spraying paper chromatograms. For this reason convenient methods had to be elaborated in order to evaluate a great number of paper chromatograms so as to be able to compare different series of substances investigated.

One method of solving the problem was described by the author¹, in which six paper chromatograms, 24 cm wide and 48 cm high, are sprayed simultaneously on a single frame. The spraying device has been developed further and now 20 series of six chromatograms each can be sprayed consecutively. When chromatograms of smaller dimensions than those mentioned above are used, even more than 120 chromatograms can be sprayed consecutively.

Fig. 1 gives an overall view of the spraying arrangement. As can be seen in the figure, the chromatograms are fastened with the aid of winged clips on glass frames that are fixed on a rotating band system. The glass frames (height 48 cm, width 144 cm) are moved, with foot control or manual control, upwards or downwards with the aid of a servo motor. The frames move in front of an illuminated screen (equipped with five Philips 65 W light-tubes of 1.5 m length). This gives an even illumination area for two frames at a time. A rack, which can be moved both horizontally and vertically, is placed at a constant distance from the frames. On the rack there are three sprayers for reagents. When the spraying is performed one frame is moved into a suitable working position. It is hereby preferable to use the foot control and thus leave the hands free to perform the spraying. The colour reagent is sprayed onto the chromatogram in a narrow line along the areas, where the samples have previously been applied. The device on which the sprayers are fixed is thereby moved up and down in front of the chromatograms at a constant distance from them. Spot chromatograms as well as line chromatograms are treated in this way.

For spraying, retouching air brushes, type IIB Grapho are used, which are coated with gold on the inside and outside in order to minimize corrosion from the reagents. Sprayers operated with compressed air produce a thin spray cone through narrow slits. The slits are movable in front of and along with the sprayers and they also prevent the reagents from contaminating other areas than those actually being sprayed. On the glass frames the spots can be drawn directly on the chromatograms with a soft pencil. This is a great advantage, since very often a number of spots decolorize rapidly, and may gradually disappear. Another possibility is to spray

several different reagents adjacent to each other on different line chromatograms within the same frame. Furthermore, one can obtain large analytical series of chromatograms, developed in different solvent systems, by spraying these on several frames in the order desired.

The storing of chromatograms of earlier analyses—until now a considerable problem—has been solved in a satisfactory way, since 20 frames are now available.

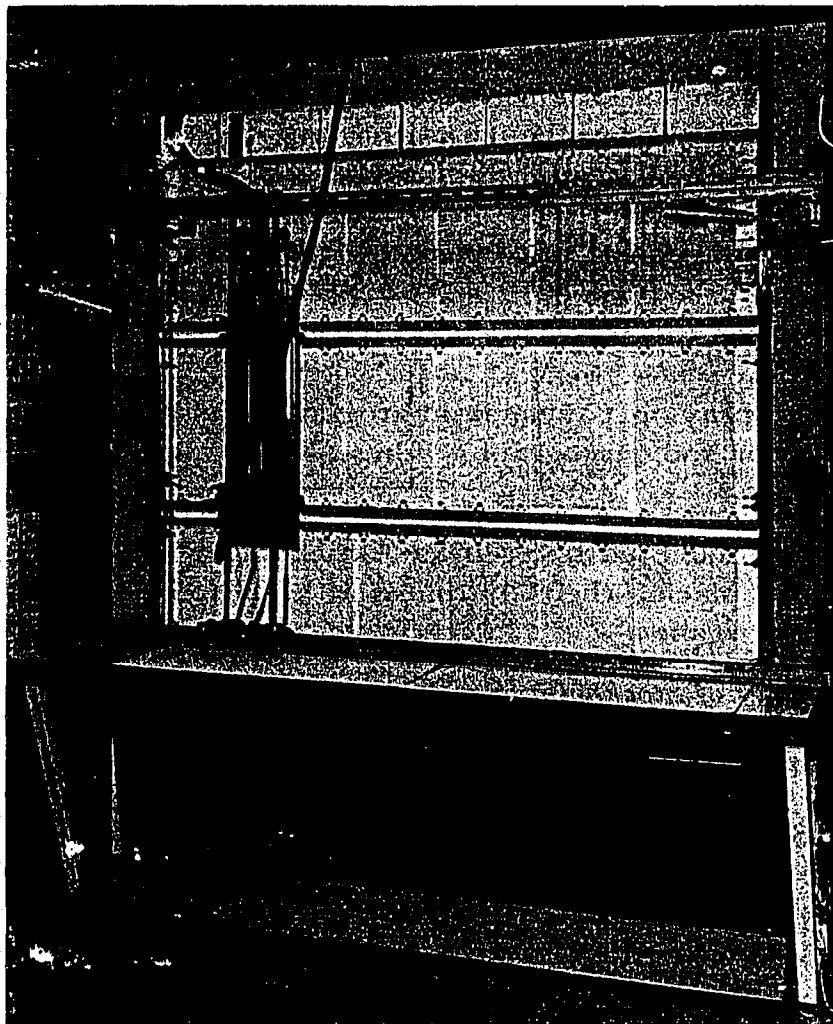


Fig. 1. Spraying arrangement. For further explanation, see text.

In order to save space, glass frames that are not in use are stored under the working table in front of the device. Chromatograms from substances analysed earlier that have been found useful for comparative purposes are left on their frames, which are moved upwards or downwards from the actual working position until the comparative studies have been terminated. Owing to the even illumination the coloured spots are well discernible, also those obtained with substances of low concentrations, and coloured slides from freshly sprayed chromatograms can easily be made for recording purposes.

Close to the movable spray-holder two R_F -meters made from elastic bands are fixed. These graduated bands can be adjusted by means of a screw, so that they follow the variations of the solvent front on the chromatogram. The R_F values of the single spots are read off by moving the spray-holder horizontally adjacent to the spots. On the glass frames there are several horizontally movable nylon threads. If required, one thread at a time can be adjusted to the appropriate R_F -level in order to obtain an R_F -network. This is very useful, provided that the solvent fronts on all chromatograms placed on one and the same frame have migrated the same distance.

Movable U.V.-lamps, placed in front of the glass frames allow the fluorescing spots to be studied in the darkroom before and after the spraying of the reagents.

In order to facilitate the exchange of the spraying solutions, a rack with flasks containing reagents is placed near the apparatus. These flasks, which have a capacity of ca. 15 ml, can be fixed directly on the sprayers.

A ventilation arrangement is connected with that part of the rack where the sprayers are placed.

The dimensions of the whole device are: height 255 cm, width 183 cm and depth 94 cm.

The device for spraying paper chromatograms has also proved to be a useful observation frame for radioautographic films, X-ray plates etc., without any rearrangement.

The author is greatly indebted to Svenska Aktiebolaget Philips, The X-ray Department, Stockholm, for placing their alternator at his disposal for this work.

*Wenner-Gren Institute, Department of Metabolic Research,
University of Stockholm (Sweden)*

L. REIO

¹ L. REIO, *J. Chromatog.*, 1 (1958) 338.

Received August 3rd, 1960

J. Chromatog., 5 (1961) 86-88

Water-cooled sample injection port for high temperature gas chromatography

In conventional gas chromatography instruments the liquid sample injection port is attached directly to the flash heater and both are at about the same temperature. When the flash heater is operated above 250°, ordinary rubber septums used in the sample injection port gradually decompose. This causes leaks in the carrier gas system and contamination problems in the chromatographic column. Further complications are encountered with capillary columns. Small fragments of decomposed septum material are swept into the carrier gas stream. These particles lodge at the entrance of the capillary column, restricting or even completely cutting off the flow

J. Chromatog., 5 (1961) 88-89