United States Patent [19]

Aubin et al.

[11] **3,777,163**

[45] **Dec. 4, 1973**

[54] **APPARATUS FOR SCANNING CHROMATOGRAMS AND THE LIKE**

[75] Inventors: **Guy Aubin**, Saint Mande; **Andre Abrioux**, Drancy; **Jules Leroy**, Vincennes, all of France

[73] Assignee: **L'Oreal**, Paris, France

[22] Filed: **Jan. 21, 1972**

[21] Appl. No.: **219,638**

[30] **Foreign Application Priority Data**

Jan. 29, 1971 France 7102994
Nov. 30, 1971 France 7142935

[52] **U.S. Cl.** ..... **250/491**, 23/254 R, 73/23.1, 250/521

[51] **Int. Cl.** **G01t 7/02**

[58] **Field of Search** ..... 250/43.5 MR, 71.5 S, 250/83.6 FT, 106 SC; 23/232 R, 232 E, 254 R, 254 E; 73/23.1

[56] **References Cited**

UNITED STATES PATENTS

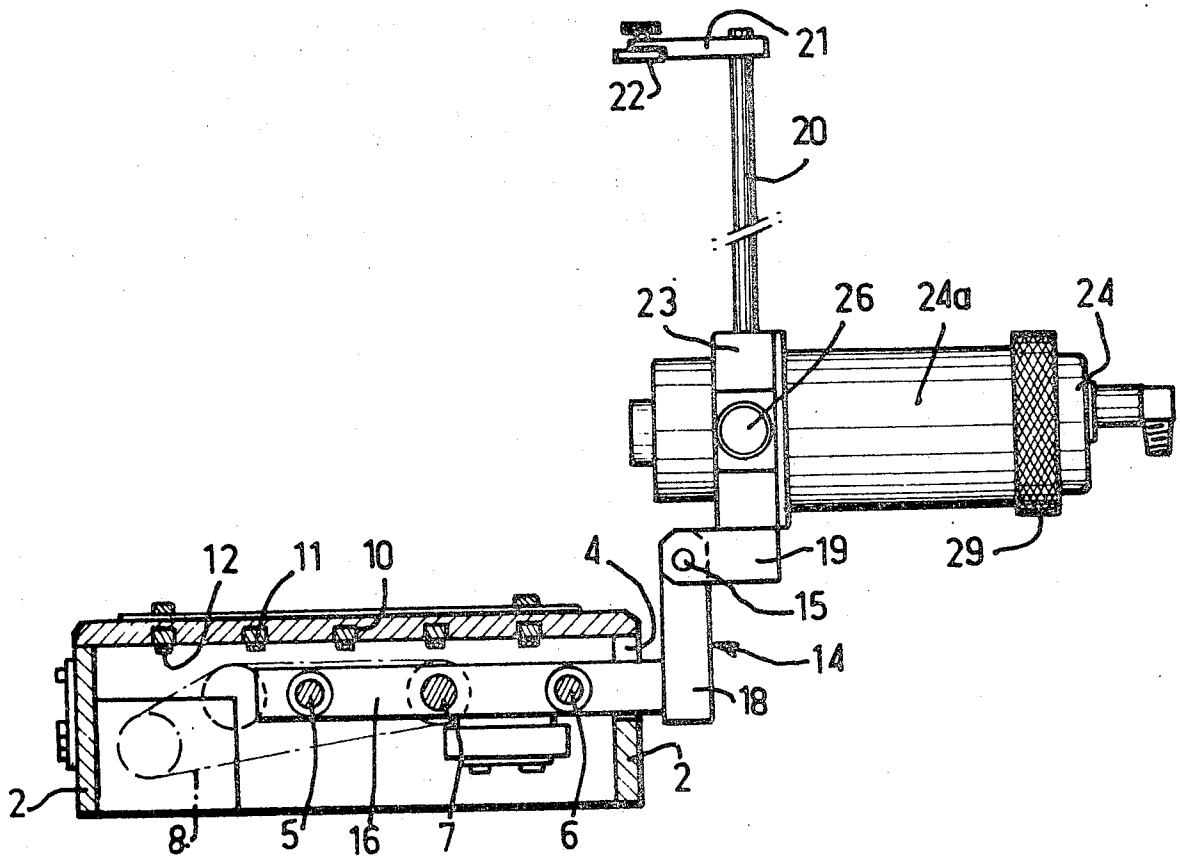
T893,011	12/1971	Hanggi et al.	250/43.5 MR X
3,116,416	12/1963	Reed	250/71.5 S X
3,623,124	11/1971	Platz	250/71.5 S X
3,200,252	8/1965	Moses et al.	250/106 SC X
3,033,986	5/1962	Fowler et al.	250/83.6 FT

Primary Examiner—Archie R. Borchelt
Attorney—Joseph A. Brisebois et al.

[57] **ABSTRACT**

Apparatus for scanning chromatograms and the like comprise stationary magnetized table, magnetized means for holding a sheet on the table, and means responsive to a property of said chromatogram which varies from point to point thereon, said means, being mounted to move parallel to the top of the table.

24 Claims, 6 Drawing Figures



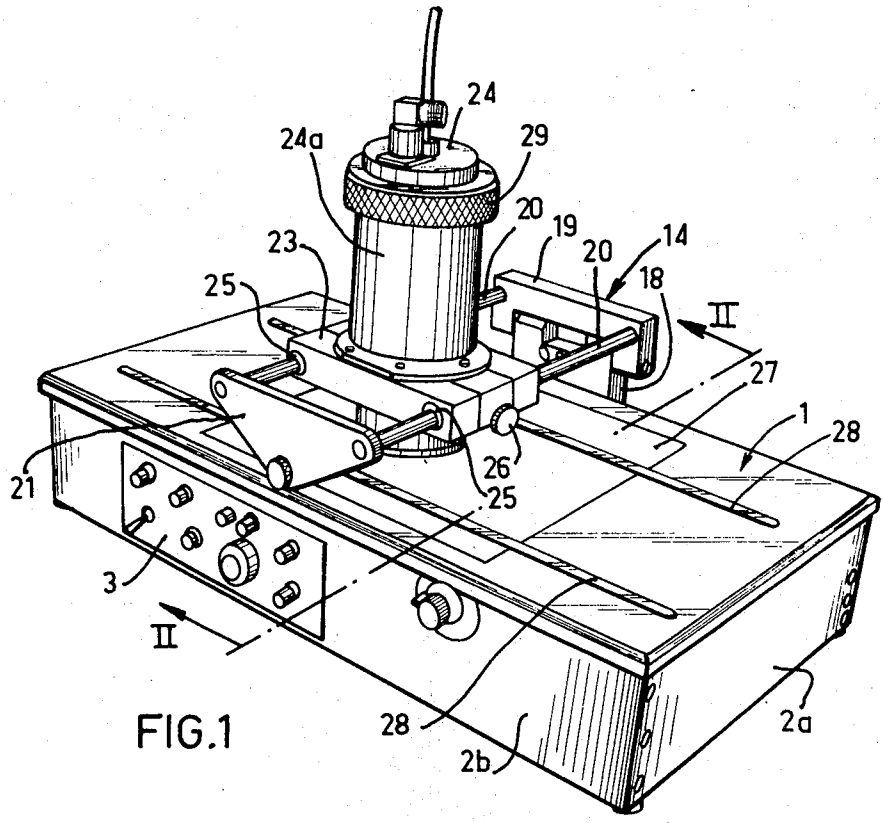

24
24a
29
20
19
20
14
23
18
25
II
27
1
28
21
26
25
3
II
28
2b
2a

FIG.1

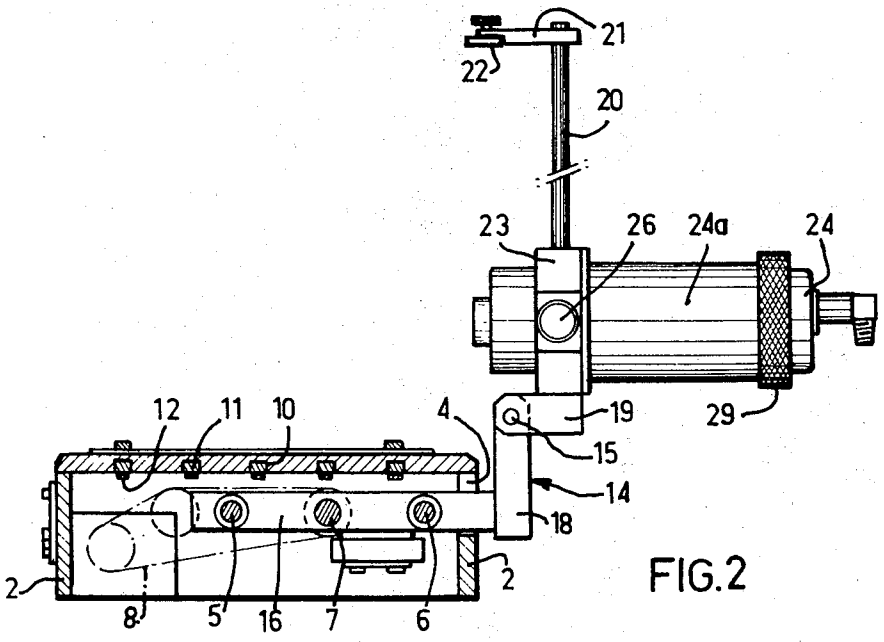

21
22
20
23
26
24a
24
12
11
10
4
19
29
15
14
18
2
2
8
5
16
7
6

FIG.2

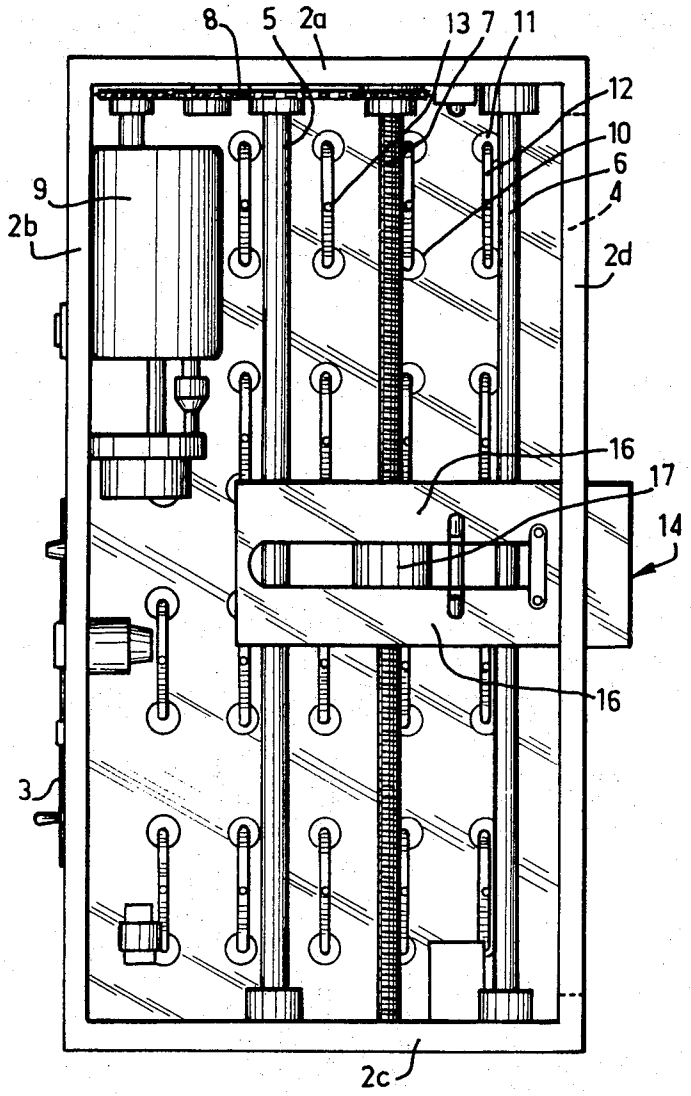


FIG. 3

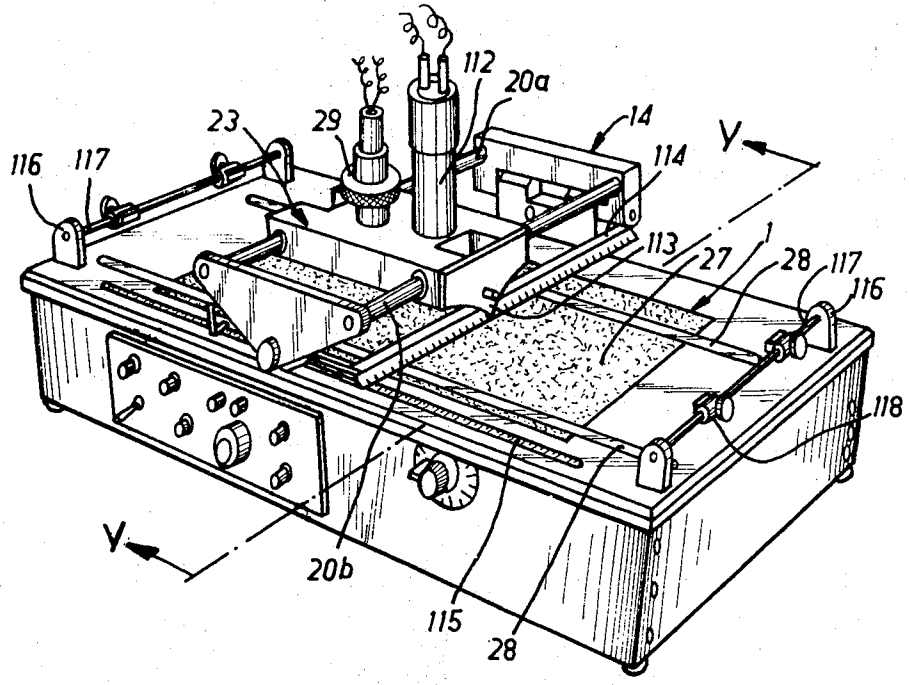


FIG. 4

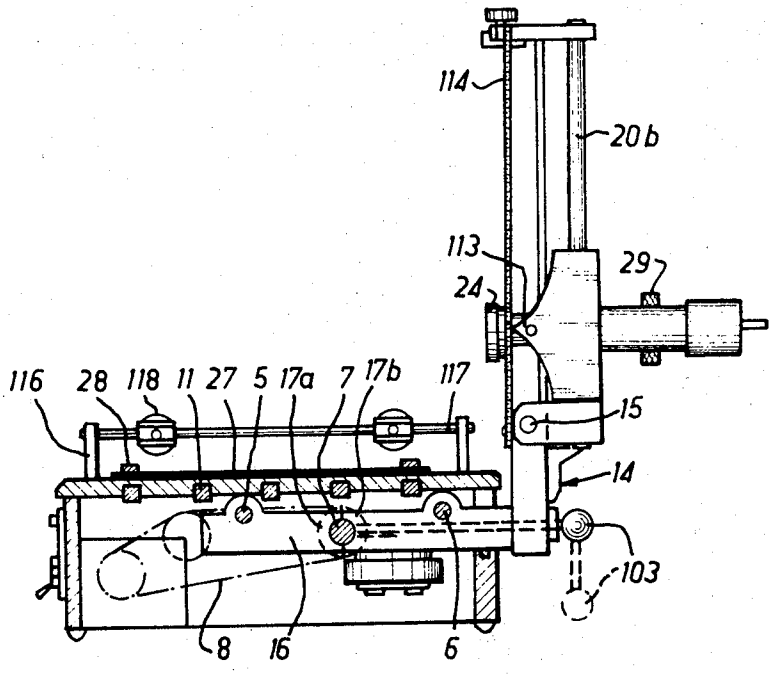

114
20b
113
29
24
116
28
118
11
27
5
17a
7
17b
117
15
14
103
8
16
6

FIG.5

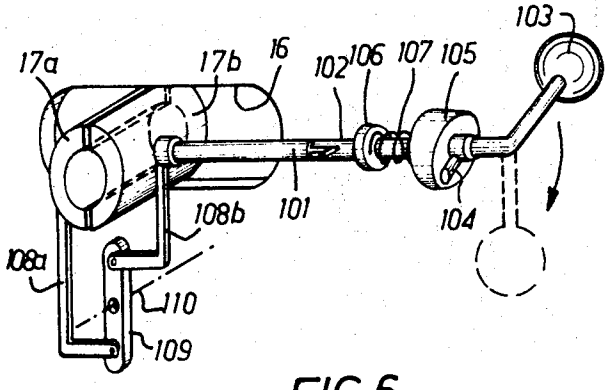

103
17a
17b
16
102
106
107
105
108b
101
104
108a
110
109

FIG.6

APPARATUS FOR SCANNING CHROMATOGRAMS AND THE LIKE

It is conventional to prepare chromatograms on paper or on a thin layer of material in order to separate the various constituents of a complex chemical composition. In some cases, when certain of the constituents thus separated on the paper of a chromatogram are radioactive, it is necessary to accurately determine the radiation emitted at each point on the chromatogram. It is then necessary to move the chromatogram on the paper relative to a radiation counter of the Geiger type. The same problem occurs when chromatograms are made on a thin layer of material, it being understood that this thin layer is made of a material which permits the separation of the constituents of the composition to be studied and replaces the paper of chromatograms made on paper.

It has already been suggested that an apparatus be used for determining the radioactivity of a chromatogram in which the chromatogram is positioned on a rotating cylinder, with the radiation counter located in a fixed position along a diametral plane of the rotating cylinder. Such apparatus gives satisfactory results only in those cases in which the chromatogram on paper provides substantial radiation at different points. On the contrary, if the quantity of radiation from the surface to be examined is small, it is necessary to equip the radiation counter with a large window so that the radiation measured by the counter emanates not only from the generatrix of the cylinder which is closest to the center of the window of the counter, but also from neighboring points, the distance of which from the window is greater than that of the generatrix the radiation from which is theoretically being measured. This introduces an error into the measurement since the distance from the center of the window to the point of origin of the radiation is not constant. Moreover, while such an apparatus is easy to use with paper chromatograms, it is not so easy to use with chromatograms on a thin layer of material between the application of the thin layer to the rotating cylinder is apt to tear the thin layer, thus preventing the convenient effectuation of the desired measurements.

It has also been suggested that an apparatus be provided which permits the radioactivity of a chromatogram to be measured and in which apparatus the radiation counter is stationary and positioned perpendicularly to a moving table which is translated in a direction perpendicular to the axis of the counter. Such a device avoids the tearing of chromatograms formed on a thin layer of material but takes up a good deal of space because the movable table must travel through a space having a length which is necessarily at least twice the length of the chromatogram to be examined.

Moreover, in all the known apparatus, the paper chromatograms are mounted on the movable support which carries them by gripping them beneath lateral bars which hold the paper along two substantially parallel lines. In the first place, it must be emphasized that the two lateral bars must necessarily be satisfactorily parallel to prevent the paper from buckling so that it is not smoothly applied to its support. Moreover, the gripping of the paper results in the creation of localized tensions which may result in slight undulations in the paper. It should be emphasized at this point that any undulation in the paper with respect to its support generates errors in the measurement to be effected, because it changes the distance between the radioactive point, the radiation of which is to be measured, and the center of the window of the radiation counter.

It is the purpose of the present invention to provide an apparatus which may be used to detect radiation at various points on a chromatogram, which apparatus eliminates the aforesaid disadvantages. The apparatus according to the invention may also be advantageously used in fields other than the study of chromatograms, in particular, whenever it is necessary to measure physical and/or chemical characteristics at different points of a plane surface being subjected to examination.

It is accordingly an object of the present invention to provide, as a new article of manufacture, an apparatus for the detection and measurement of physical and/or chemical characteristics at different points on a surface being examined, said apparatus comprising a supporting table and at least one measuring device, the supporting table and said at least one measuring device being mounted for relative movement and characterized by the fact that, in the first place, the supporting table is stationary and the measuring device or devices is translated with respect to the supporting table and, in the second place, the surface to be examined is attached to the supporting table by means of at least one thin member made of a magnetic material, the entire surface of which is adapted to be applied to the flat surface of the supporting table, said supporting table being itself made of a magnetic material and constituting one pole of a permanent magnet, the edges of the sheet to be examined being inserted between the thin member and the supporting table.

In a first embodiment of the invention, the supporting table may comprise certain transparent zones in alignment with at least one device for emitting radiation so as to permit the examination of the transparency of the sheet being examined while positioned on the supporting table. In a second embodiment, a measuring device is associated with a device for emitting radiation, which preferably moves with said measuring device during its displacements relative to the surface being examined, which permits the examination of the surface by reflection. In a third embodiment the measuring device receives radiation or vibrations emitted by the surface being examined while lying on the supporting table.

The two first embodiments hereinbefore envisaged may advantageously be used for the study of colorimetric densities, brightness, fluorescence, transparency, the study of the state of the surface by an echo system, and the study of the granulametry of the surface being examined. The radiation used may be light rays in the visible or nonvisible spectrum or alpha, beta or gamma radiation. The vibrations used may in particular be ultrasonic vibrations.

One example of the third embodiment hereinbefore mentioned relates to the study of radioactive emissions from different points on chromatograms. In this example, the measuring device is a radiation counter and the surface being examined is a chromatogram on paper or on a thin layer of material. In a preferred embodiment of the invention the thin member which holds the surface being examined on the supporting table consists of a plate having a window for one or more flexible sheets, with the sheet being examined being preferably held in place by two thin members positioned on opposite sides of that portion of the surface of the sheet which is to

be examined. The supporting table consists of a plate of ferromagnetic material and carries on its face remote from the chromatogram permanent magnets, the fields of which all run in the same direction and substantially perpendicular to the supporting table. The permanent magnets are discs of ferrite positioned in seats in the surface of the supporting table remote from the material being examined. The supporting table is rectangular in shape and the measuring device moves parallel to the major axis of the supporting table. The apparatus comprises a single measuring device which is carried by mobile means for translating it parallel to a major axis of the supporting table. The mobile means which carries the measuring device comprises a hinge permitting the axis of the measuring device to be swung through an angle of substantially 90° about the axis of the hinge. The axis of the hinge of the movable means is parallel to the major axis of the supporting table. The part of the mobile means which can swing around said hinge may take two extreme positions, in one of which it abuts the other part of the mobile means, and the axis of the measuring device is parallel to the supporting table, and in the second of which it rests by means of a roller on the supporting table and the axis of the measuring device is perpendicular to said supporting table. The mobile means, in its movement relative to the table support, is guided by at least one guide bar parallel to the major axis of the supporting table and is fixed to a nut which cooperates with a threaded rod which is preferably rotated at constant speed through a motor and reduction gearing. This motor, the corresponding transmission, the threaded drive rod of the mobile means and the guide bar or bars of the mobile means, are positioned beneath the supporting table which is mounted on a frame in the form of a parallelopipedic box, with the supporting table constituting its upper surface. The measuring device is vertically slidable in a cylindrical casing attached to the mobile means and in actuated by a threaded ring cooperating with threads on the wall of the casing.

In a variation of the preferred embodiment just described, the apparatus according to the invention comprises two measuring devices positioned on the same axis on opposite sides of the supporting table. The supporting table has, in alignment with the axis of the measuring device positioned beneath the supporting table, a slot permitting the passage of radiation and/or vibrations from those points on the surface being examined which are in alignment with said slot. The two measuring devices are carried by the same mobile means, which is translated with respect to the supporting table.

In a first improvement, the mobile means may be separated from the threaded rod which drives it by opening up the nut to which it is attached and which cooperates with said threaded rod. This is preferably accomplished by manually separating the two halves of the nut. Such separation permits the rapid manual movement of the mobile equipment with respect to the table when it is desired to bring the measuring device into alignment with a predetermined point on the surface being examined. In a variation of this arrangement, in order to achieve the same result, the motor which normally drives the threaded rod may be associated with a clutch, which, when actuated, simultaneously connects the threaded rod to another relatively high speed driving motor.

The apparatus which has just been described makes it possible to carry out measurements relative to points on the surface being examined which are spaced along a line parallel to the axis of translation of the mobile means. In a second improvement a course-reversing contact is provided at the end of the path of travel of the mobile means so as to automatically permit the desired measurements to be made along the same line travelled in the reverse direction, either at the same speed, or at a different speed. This improvement makes it possible to obtain a systematic doubling of the number of measurments along each line on the surface being examined. It is also possible to provide, at the end of the path of travel of the mobile means, a contact for stopping said mobile means.

In a third improvement according to the invention the movement of the measuring device with respect to the supporting table may be produced, not merely by longitudinal translation of the movable means with respect to said table, but also by the transverse translation of a movable carriage on the mobile means which carries the measuring means for movement with respect to the mobile means which supports it. The transverse translation of the measuring means may be produced by a low speed motor attached to the movable carriage, said low speed motor driving a gear which cooperates with a rack fixed to the mobile means. The low speed motor is supplied through a switch positioned at tne end of the path of travel of the mobile means. In a particular case in which the apparatus according to the invention relates to the study of the radiation emitted by a chromatogram, the transverse displacement of the radiation counter with respect to the movable means may be carried out by hand, or automatically, as indicated above. The members for holding the chromatogram on the supporting table are simply laid on the edges of said chromatogram and are held on the supporting table by the magnetic field of the permanent magnets associated with that table. It is obvious that the signals provided by the radiation counter may be supplied in a conventional manner to integrating means and/or recording means which make is possible to count the measurements effectuated by the counter. Variable and/or adjustable values may be adopted for the speed of translation of the counter. It is also possible to equip the supporting table with millimeter scales which make it possible to locate the points in the surface from which the radiation is being detected by the counter. In a variation, the apparatus according to the invention comprises two radiation counters on the same axis positioned symmetrically with respect to the supporting table, said table comprising, in alignment with the axes of these two counters, a slot permitting the passage of radiation from points on the chromatogram which are in alignment with said slot, said two counters being carried by the same movable means and driven in translation with respect to the supporting table. This variation makes it possible to improve the facility of raading in the case of chromatograms on paper because the loss of time due to the measurement of a single side of the paper is eliminated.

It should be noted that, when the device according to the invention is applied to the examination of a chromatogram, the chromatogram is attached to the supporting table without being squeezed at its edges so that optimum attachment of the chromatogram is obtained and undulations of said chromatogram with respect to

the supporting table is avoided, thus making it possible to eliminate one of the causes of errors in such measurements. Moreover, the supporting table, being stationary, may have relatively small dimensions, and in particular, may have a size substantially equal to that of the chromatograms to be analyzed. Finally, since the supporting table is flat, any cracking of chromatograms formed on thin layers of material is avoided.

In order that the object of the invention may be better understood two embodiments thereof will now be described, purely by way of illustration and example, with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view showing a first embodiment of a device for detecting and measuring in accordance with the invention;

FIG. 2 is a section taken along the line II—II of FIG. 1, showing the axis of the radiation counter positioned horizontally so that a chromatogram may be mounted on the supporting table;

FIG. 3 is a bottom plan view of the apparatus of FIG. 1;

FIG. 4 is a perspective view of a second embodiment of an apparatus according to the invention, also adapted for use in studying chromatograms;

FIG. 5 is a section taken along the line V—V of FIG. 4, showing the axis of the radiation counter moved to a horizontal position so that a chromatogram may be placed on the supporting table; and

FIG. 6 is a schematic perspective view showing the device for operating the two halves of the nut and thereby permitting the mobile means to be separated from the threaded drive rod of the apparatus of FIG. 4.

Referring now to FIGS. 1 to 3, it will be seen that reference numeral 1 indicates the rectangular supporting table of the apparatus according to the invention. The table 1 constitutes the upper part of a parallelopipedic box which serves as the stationary framework of the apparatus. Reference numerals 2*a*, 2*b*, 2*c* and 2*d* indicate the four vertical sides of this box, which has no bottom. The side 2*b* carries on its outer surface a plate 3 which supports the control switches and indicators for controlling the apparatus. The side 2*d* which is opposite the side 2*b* has a longitudinal slot 4 which extends the length of the supporting table 1. Between the two transverse sides 2*a* and 2*c* are two parallel guides 5 and 6 which serve as crossbars. The plane defined by the bars 5 and 6 is parallel to the plane of the supporting table 1. Halfway between the bars 5 and 6 is a threaded rod 7 parallel to the two bars 5 and 6 and driven in rotation by a chain 8 through a slow speed motor 9 carried by the side 2*b* of the framework of the apparatus. Slow speed motor 9 is mounted inside the box defined by the sides 2*a*, 2*b*, 2*c* and 2*d* and the supporting table 1. Cylindrical seats 10 are formed in the lower surface of the supporting table 1, which is made of an alloy of the Duralumin type. Discs of ferrite 11 are located in these seats and constitute permanent magnets. The discs 11 are held in the seats 10 by tabs 12. The ends of each tab are in alignment with two adjacent discs 11, while the central part of the tab is connected to the lower surface of the supporting table 1 by a screw 13. Mobile means 14 is movable with respect to the stationary part of the apparatus constituted by the supporting table 1 and the sides 2*a*, 2*b*, 2*c* and 2*d*. The mobile means comprises two parts articulated about a hinge, the axis 15 of which is parallel to a major axis of the supporting table. The lower part of the mobil means is connected to the framework and may be translated with respect to said framework, whereas the upper part, by reason of its articulation about the axis 15, may be rotated through an angle of 90° with respect to the framework about said axis 15. The lower part of the mobile means comprises two crossbars 16 separated from each other by a nut 17. The two crossbars 16 are perpendicular to the sides 2*b*, 2*d* of the framework and the nut 17 cooperates with the threaded rod 7. The two crossbars 16 are connected to each other at their two ends and pass through the side 2d of the framework via the longitudinal slot 4. They are connected to a plate 18 perpendicular thereto which carries the shaft 15. The upper part of the mobile means 14 comprises a yoke 19 which brackets the plate 18 and is articulated with respect thereto about the shaft 15. The yoke 19 is attached to two parallel bars 20 connected to an end plate 21, the lower part of which carries a roller 22 which is adapted to roll on the supporting table 1 when the plane of the two bars 20 is parallel to the plane of the supporting table 1. The two transverse bars 20 carry a carriage 23 on which a radiation counter of the Geiger type is mounted. The counter 24 is mounted inside a cylinder 24*a* attached to the carriage 23. A threaded ring 29 is attached to the counter 24 and the threading on this ring cooperates with threading carried by the cylinder 24*a* in order to permit adjustment of the height of the counter 24. Transverse sliding of the carriage 23 on the bars 20 is permitted by longitudinal bearings 25. The position of the carriage 23 with respect to the end plate 21 is determined by a lock screw controlled by a knurled knob 26. The counter 24 has, on the surface facing the supporting table, a rectangular window, a set of windows of different dimensions being associated with a single counter 24.

When the distribution of the radioactive elements on a chromatogram on paper is to be examined, the paper 27 of the chromatogram is mounted flat on the supporting table 1 and the edges of this paper are held in place by positioning a thin steel blade 28 on each of the edges parallel to the major axis of the supporting table 1. The two blades 28 are made of a ferromagnetic material and attracted to supporting table 1 because of the presence of the discs of ferrite 11. The paper 27 is held firmly without any squeezing of the paper at its edges so that any undulation of the paper with respect to its support is avoided. When the paper has been positioned on the support 1, the upper part of the mobile means is lowered from the position shown in FIG. 2 to the position shown in FIG. 1, that is to say until the roller 22 comes into contact with the upper surface of the supporting table 1. The center of the window of the counter 24 is then in position at a predetermined vertical distance from the paper 27 regardless of which point on the paper is in alignment of the counter 24.

The motor is then started by one of the control switches positioned on the plate 3. Motor 9 drives through a chain 8 the threaded rod 7, which cooperates with the nut 17 which causes translation of the mobile means 14 parallel to the major axis of the supporting table 1. Depending on which zone of the paper 27 is to be examined by the counter 24, the position of the movable carriage 23 is adjusted with respect to the end plate 21. It is obvious that all of the surface of the paper 27 may be progressively explored by displacing the car-

riage step by step over the entire width of the supporting table **1**.

It will be seen that, in the apparatus according to the invention, it is especially easy to mount the chromatogram paper **27** on the supporting table, partly because of the way in which it is held by the thin blades **28**, and partly because of the possibility of positioning the axis of the counter **24** horizontally by moving the yoke **19** on the plate **18** to the position shown in FIG. **2**. It should also be noted that the accuracy of measurement of the radiation is improved because of the fact that, in the first place, any variation in the distance between the paper **27** and the counter **24** is systematically avoided, and because in the case of chromatograms on thin layers, there is no risk of deterioration of the layers since the supporting table **1** is rigorously flat.

Referring now to FIGS. **3** to **6**, it will be seen that the apparatus which is described is quite similar to the preceding embodiment. For those elements of this second apparatus which are identical to those of the first embodiment the same reference numerals have been used. For the details of such similar elements reference should be made to the preceding description. On the lower surface of the supporting table **1** of this second embodiment discs of ferrite **11** constituting permanent magnets have been positioned. Inside the supporting table **1** are two guidebars **5** and **6** parallel to the major axis of the table and a threaded rod **7** positioned between the said two bars. The rod **7** is driven in rotation through a chain **8** by a slow speed motor. The mobile means **14** comprises two parts which are articulated about a hinge, the axis **15** of which is parallel to the major axis of the supporting table **1**. The lower part of the mobile means connected to the framework may be translated with respect thereto while the upper part, because of its articulation about the axis **15** may be rotated through an angle of 90° with respect to the framework carrying said axis **15**.

The lower part of the mobile means comprises two crossbars **16** connected to each other and embracing two half nuts **17***a*, **17***b*, constituting a nut cooperating with the threaded rod **7**. These two half nuts **17***a*, **17***b* may slide parallel to the center line between the two crossbars **16** while guided by slideways carried by the crossbars. The half nut **17***b* is fixed to a rod **101** adapted to be translated parallel to the minor axis of the supporting table by a rod **102** which may be rotated by a handle **103**. Rod **102** is translated with the rod **101** but may rotate with respect thereto. The rods **101** and **102** are co-axial. The rod **102** carries a pawl **104** which cooperates with a helical cam **105** attached to the supporting table **1**. The rod **102** carries a stop washer **106** biased by a spring **107** which bears at one end on the lateral part of the framework. The half nut **17***b* is fixed to a vertical arm **108***b*, whereas the half screw **17***a* is fixed to a vertical arm **108***a*. The two arms **108***a* and **108***b* are pivotally connected at their other ends to two ends of a lever **109**. The lever **109** is adapted to rotate about a shaft **110** carried by the crossbar **16** of the mobile means **14**. When the user grasps the end of **103** and rotates the rod **102** about its axis the rods **101** and **102** are translated parallel to the minor axis of the supporting table by reason of the cooperation between the pawl **104** and the helical cam **105**. Contact between the pawl and the ramp is maintained by the helical spring **107**. When the handle **103** is in the position shown in solid lines on FIGS. **2** and **3** the two half nuts **17***a* and **17***b* have their lower edges positioned against each other and the nut which they form may cooperate with the threaded rod **7**. On the contrary, if the handle **103** is turned to bring it into the position shown in broken lines on FIGS. **2** and **3**, the rod **101** is translated so as to separate from the threaded rod **7**, which also separates the half nut **17***b* connected thereto and, through the lever **109** separates the half nut **17***a* on the opposite side. The two half nuts **17***a* and **17***b* slide in grooves provided for this purpose in the two bars **16** of the mobile means **14**. The upper part of the mobile means **14** comprises two transverse guidebars **20***a*, **20***b*. The bar **20***a* is cylindrical and the bar **20***b* has a half flat perpendicular to the supporting table **1** opposite the bar **20***a*. On this half flat of the bar **20***b* is a rack (not shown on the drawing) which cooperates with a gear carried by a low speed motor **112** positioned on the movable carriage **23** which may be displaced transversely along the bars **20***a*, **20***b* of the mobile means **14**. The movable carriage **23** also carries a radiation counter **24** slidable with respect to a cylinder carried by the carriage **23**. The counter **24** is fixed to a threaded ring **29**. The threads on the ring **29** cooperate with threads carried by said cylinder in order to permit regulation of the height of the counter **24**. The movable carriage **23** carries a pointer **113** which moves in alignment with a scale **114** carried by the movable member **14**. The scale **114** is parallel to the minor axis of the supporting table **1**. At the edge of the supporting table **1** a graduated scale **115** is inlaid into the supporting table, with one end of the ruler **114** in alignment with the scale **115**. Adjacent the two transverse edges of the supporting table **1** are two pairs of vertical tabs **116** which support a rod **117** at each end of the table. Each rod **117** has positioned thereon at least one microswitch **118** transverse position of which is adjustable. This microswitch is adapted to cooperate with a member on the mobile means when said mobile means has reached the end of its path of travel with respect to the supporting table. The surface to be examined, in the present case a chromatogram on paper, is mounted on the supporting table **1** by means of two ferromagnetic blades **28**. The apparatus which has just been described operates in substantially the same manner as the first embodiment described in connection with FIGS. **1** to **3**. However, when it is desired to move the mobile means **14** rapidly in order to position the window of the counter **24** above a predetermined point on the chromatogram **27**, it suffices to actuate the handle **103** to separate the two half-nuts **17***a*, **17***b* and then displace the mobile means **14** by sliding it along the guidebars **5** and **6**. The mobile means **14** may be driven through the threaded rod **7** by rotating the handle **103** in the opposite direction. This brings the two half-nuts **17***a*, **17***b* back together around the threaded rod **7**.

When it is desired to automatically scan the entire surface of the chromatogram **27** the microswitch **118** positioned at the end of the path of travel of the movable means **14** is connected to actuate a low speed motor **112** for a predetermined time. This, acting through the gear of the slow speed motor **112** and the corresponding rack, causes transverse displacement of the movable carriage **23** which slides on the bars **20***a* and **20***b*. This transverse displacement has a value which is a function of the time of rotation of the low speed motor **112**. There is thus provided, in automatic sequence, movement of the movable member **14**, the

direction of rotation of the threaded rod 7 having been reversed by means of a microswitch 118 positioned at the end of the path of travel, or by the same microswitch which has just actuated the low speed motor 112. It will be seen that it is thus possible to scan the entire surface of the chromatogram 27 in a single completely automatic operation.

The existence of the scales 114 and 115 makes it possible to locate with precision the position of a zone on the chromatogram 27 and examine this zone selectively by bringing the movable means into position after having separated the two half-nuts 17*a*, 17*b*, as previously described. It will of course be appreciated that the embodiments which have just been described have been given purely by way of illustration and example, and may be modified as to detail without thereby departing from the basic principles of the invention. In particular, in the first embodiment hereinbefore described, the threaded ring 29 may have a very low pitch and be graduated to permit the precise regulation of the distance between the window of the counter and the chromatogram.

What is claimed is:

1. Apparatus for the detection and measurement of the characteristics of a surface, said apparatus comprising a stationary, magnetized supporting table, at least one measuring device mounted for translation with respect to said supporting table, and at least one thin member made of a magnetic material positioned on said supporting table to hold a sheet having a surface to be examined with the edge of said sheet inserted between the thin member and the supporting table.

2. Apparatus as claimed in claim 1 in which the supporting table comprises several transparent zones in alignment with at least one radiation emitting means positioned therebeneath to permit examination of the transparency of the surface being examined while positioned on said supporting table.

3. Apparatus as claimed in claim 1 in which the measuring means is associated with radiation means mounted to move with said measuring means parallel to the surface of said supporting table to permit examination of the surface to be examined by reflection.

4. Apparatus as claimed in claim 1 in which the measuring means is responsive to radiations emitted by the surface to be examined.

5. Apparatus as claimed in claim 4 in which the surface to be examined is a chromatogram, and said measuring device is a radiation counter of the Geiger type.

6. Apparatus as claimed in claim 1 in which said at least one thin member comprises a pair of flexible blades adapted to be positioned along two opposite edges of the surface to be examined.

7. Apparatus as claimed in claim 1 in which the supporting table is a plate of ferro-magnetic material which carries on the face remote from the surface to be examined permanent magnets having parallel fields substantially perpendicular to the surface of the supporting table.

8. Apparatus as claimed in claim 7 in which the permanent magnets of the supporting table are discs of ferrite positioned in seats in the surface of the supporting table remote from the surface carrying the sheet to be examined.

9. Apparatus as claimed in claim 1 in which the supporting table is substantially rectangular and comprising a single measuring device which is translated parallel to the major axis of the supporting table.

10. Apparatus as claimed in claim 9 in which the measuring means is carried by mobile means mounted for translation parallel to the major axis of the supporting table.

11. Apparatus as claimed in claim 10 in which the mobile means which carries the measuring means comprises a hinge permitting said measuring means to be rotated through an angle of substantially 90° about the axis of said hinge.

12. Apparatus as claimed in claim 11 in which the axis of the hinge of the mobile means is parallel to the major axis of the supporting table.

13. Apparatus as claimed in claim 11 in which said measuring means is rotatable about the axis of said hinge between two positions in the first of which it is clear of the supporting table with the axis of the measuring device parallel to the supporting table and in the second of which it rests through a roller on the supporting table with the axis of the measuring means perpendicular to said supporting table.

14. Apparatus as claimed in claim 10 in which said mobile means is guided for translation relative to said supporting table by at least one guide bar parallel to a major axis of the supporting table and is attached to a nut which cooperates with a threaded rod rotatably driven at constant speed by a low speed motor.

15. Apparatus as claimed in claim 14 in which the low speed motor, a transmission therefrom, the threaded driving rod of the mobile means, and the guide bar of the mobile means are positioned beneath the supporting table, said supporting table being mounted on a framework in the form of a parallelopipedic box with the supporting table constituting the upper surface of said box.

16. Apparatus as claimed in claim 10 in which the radiation counter is vertically slidable in a sheath carried by the mobile means and is mounted to move with a ring having threads cooperating with threads on the inner wall of the sheath.

17. Apparatus as claimed in claim 1 which comprises measuring means mounted coaxially on opposite sides of the supporting table, said supporting table comprising, in alignment with the axis of the measuring means positioned beneath the supporting table, a slot for permitting the passage of radiation to a point on the surface being examined in alignment with said slot, both said measuring means being carried by the same mobile means for translation relative to said supporting table.

18. Apparatus as claimed in claim 14 in which said nut is in two parts and comprising manually operable means for separating the mobile means from the threaded rod by separating the parts of said nut.

19. Apparatus as claimed in claim 14 in which the low speed driving motor for the threaded rod is associated with a clutch which, when actuated, simultaneously connects the threaded rod to be driven by another high speed motor.

20. Apparatus as claimed in claim 10 in which the mobile means comprises at least one transverse guide member along which a movable carriage supporting a measuring device travels.

21. Apparatus as claimed in claim 20 in which the movable carriage carries a low speed motor driving a gear which cooperates with a rack on a transverse guide member on the mobile means.

22. Apparatus as claimed in claim 10 in which the supporting table has a first graduated scale parallel to the major axis of said table and the mobile means has a second graduated scale parallel to the minor axis of the table, said second scale having preferably a zone in alignment with the first scale and index means being mounted on the measuring device and positioned in alignment with the second scale.

23. Apparatus as claimed in claim 10 in which the mobile means is attached to a recorder the marking member of which cooperates with a stationary recording sheet, one of the coordinates of the recording curve corresponding to the displacement of the mobile means parallel to a major axis of the support while the other coordinate corresponds to the result of the measurement obtained from the measuring means carried by the mobile means.

24. Apparatus as claimed in claim 10 comprising a limit switch at the end of the path of travel of said mobile means, which switch is connected to one of said motors to initiate a predetermined operation by that motor when said switch is actuated.

* * * * *