Patented Oct. 26, 1954

2,692,820

UNITED STATES PATENT OFFICE

2,692,820

METHOD AND MEANS FOR EFFECTING AUTOMATIC FRACTIONATION

Clayton D. Alway and William J. Haines, Kalamazoo, Oliver R. Woods, Scotts, and Norman A. Drake, Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich., a corporation of Michigan

Application October 28, 1950, Serial No. 192,722

17 Claims. (Cl. 23—309)

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This invention relates in general to analytical equipment and more specifically to an automatic instrument employing refraction and differential absorption of electromagnetic radiation for detecting, separating and collecting in fractions the effluent from a fractionating column.

The process of separating and collecting in fractions eluted compounds from a fractionating column has heretofore been conducted substantially manually. Thus, the continuous presence of a skilled operator for changing the receptacles in which the product is collected, for changing the solvent being introduced into the column, and for filling the proper number of receptacles with any given solvent and/or solute as products of the fractionation has been necessary where such processes have formerly been desired. However, due to the slow action of a fractionating column, an operation involving same often extends over a period of several days during much of which time the operator is frequently idle. Furthermore, unless shifts of operators are provided beyond the normal working hours, the process must be stopped overnight which often introduces further complications.

Accordingly, it becomes apparent that the provision of an entirely automatic instrument which can be pre-set by an operator to effect the above mentioned operation and then be disregarded, would not only relieve the operator for other work, but would also permit continuous operation of the process over extended periods of time. By the equipment hereinafter disclosed, collection of a series of fractions, which would require days by ordinary procedures, may now be accomplished in a few hours.

Accordingly, a primary object of this invention is the provision of an instrument for automatically separating and collecting the respective compounds eluted from a fractionating column.

A further object of this invention is the provision of an instrument, as aforesaid, having means for supporting a plurality of containers for collecting eluted compounds and further means for automatically positioning said containers during the collection of said eluted compounds.

A further object of this invention is the provision of an instrument, as aforesaid, having means for automatically controlling the amount of eluted compounds collected by said individual containers.

A further object of this invention is the provision of an instrument, as aforesaid, having

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means for introducing in a predetermined sequence a variety of solvents into a fractionating column.

A further object of this invention is the provision of an instrument, as aforesaid, having means for controlling the period during which any particular solvent is directed into said fractionating column and, accordingly, the number of containers which are filled with discharge from the column including a particular solvent.

A further object of this invention is the provision of an instrument, as aforesaid, having means insuring a continuous supply of a given solvent to the fractionating column.

A further object of this invention is the provision of an instrument, as aforesaid, which can be operated over a relatively long period of time without constant attention from an operator.

A further object of this invention is the provision of an instrument, as aforesaid, which greatly reduces and greatly simplifies the separation and collection in fractions of compounds eluted from a fractionating column, over methods and means presently available.

Other objects and purposes of this invention will become apparent to persons familiar with this type of operation upon referring to the accompanying drawings and upon reading the following specification.

For illustrations of a preferred embodiment of our invention, attention is directed to the accompanying drawings in which:

Figure 1 is a broken side elevation view of an automatic instrument for detecting, separating and collecting in fractions compounds eluted from a column, including schematically a portion of the electric circuitry involved.

Figure 2 is a sectional view substantially as taken along the line II—II of Figure 1.

Figure 3 is a sectional view substantially as taken along the line III—III of Figure 2.

Figure 4 is a sectional view substantially as taken along the line IV—IV of Figure 3.

Figure 5 is a sectional view substantially as taken along the line V—V of Figure 2.

Figure 6 is a sectional view substantially as taken along the line VI—VI of Figure 5.

Figure 7 is a sectional view substantially as taken along the line VII—VII of Figure 5.

Figure 8 is a sectional view substantially as taken along the line VIII—VIII of Figure 5.

Figure 9 is a sectional view substantially as taken along the line IX—IX of Figure 6, and for