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SAMPLE COLLECTOR

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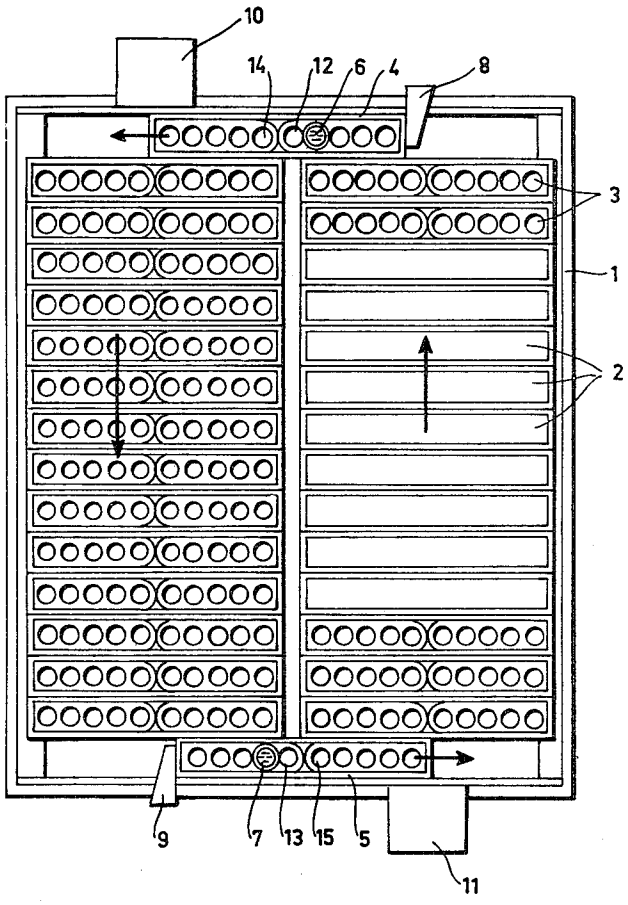

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SAMPLE COLLECTOR

Bo Gösta Forsström, Mariehall, Sweden, assignor to LKB-Produkter Aktiebolag, Stockholm, Sweden, a company of Sweden

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The invention relates to a sample collector, i.e. an apparatus for distributing a flow of a fluid to a plurality of receptacles, and particularly a flow of a liquid, having a composition which changes in time. As an example, such a sample collector can be used together with a device for chromatographic analysis or separation, in which the liquid from said device shall be distributed into a plurality of vessels for being analyzed.

In a usual design of a sample collector the receptacles, usually test tubes, are arranged in several concentric circles on a circular, rotatable table. The table is rotated step by step, and the filling nozzle for the liquid is moved in a radial direction from one circle of test tubes to another. The main object of the invention is to provide a sample collector which is more compact than a sample collector of said known type, i.e. requires less space, and which makes it possible to use a stationary filling nozzle; the test tubes shall be responsible for the relative movement between the filling nozzle and the test tubes.

One embodiment of the invention comprises a rectangular base; on said base spaces for receiving a plurality of holders; rectangular elongated holders provided on said base in all said spaces but one, said holders being arranged in two rows on the base, each holder being arranged to receive a plurality of receptacles for the samples; means for moving the extreme holder of each row to the other row in a step by step movement; and means for moving all holders of each row in the longitudinal direction of the row. This embodiment can serve one filling station. In another embodiment of the invention holders are provided on the base in all spaces but two. This embodiment can serve two filling stations, as will be described hereinbelow with reference to the accompanying drawing.

The illustrated device consists of a rectangular base 1 on which there are provided elongated box-shaped holders 2 arranged to receive test tube racks 3, each rack containing ten test tubes. The holders are arranged in two rows, and each row can contain sixteen holders, at most. Actually, each row contains fifteen holders only. This makes it possible for the extreme holder in each row to be moved in its longitudinal direction to the empty space in the other row. In the illustrated position the extreme holders 4 and 5 are being moved from one row to the other in the direction indicated by the arrows.

When the test tubes are being filled they are in the positions indicated 6 and 7. Above said test tubes there are filling nozzles for a liquid, for example from a chromatographic apparatus. Consequently, the illustrated device can serve two columns simultaneously.

The holders are pushed from one row to the other by members 8 and 9, illustrated in a simplified way, arranged to move the holders simultaneously and step by step, each step being equal to the distance between the centers of two adjacent test tubes. When the last test tubes in the holders 4 and 5 have been filled in the positions 6 and 7 the members 8 and 9 move the double distance, thus pushing said last test tubes from the positions 6, 7 directly to the positions 14, 15. There is no reason for letting the last test tubes stop in the positions 12, 13. The holders can be moved at pre-determined intervals. Alternatively, they can be moved when an auxiliary container which is connected to the filling nozzle has been filled with liquid, all test tubes being thus filled with equal quantities of liquid. These principles for filling the test tubes, and the automatic means used for such filling, are well known in the chromatographic technique and shall not be explained here.

All the holders of each row are moved step by step by members 10 and 11, illustrated in a simplified way. In each step the holders are moved a distance equal to the width of one holder.

The operating devices for the members 8, 9, 10 and 11 are synchronized in a known way to the effect that members 10 and 11 come into operation as soon as members 8 and 9 have finished pushing the extreme holders 4 and 5 from one row to the other.

In order to make the illustrated apparatus as compact as possible it is desired that the holders and the test tube racks are as narrow as possible. In order to make such elongated, narrow test tube racks stand steadily after having been removed from the sample collector they consist of two parts interconnected by a hinge. Each part contains five test tubes. When the rack is to be placed on a table the two parts are turned to make an angle with each other.

The illustrated apparatus can be modified so as to contain 31 holders instead of 30. Suppose that the filling occurs in position 7. The test tubes in holder 5 are filled as described. Thereafter holder 5 is pushed to the right-hand row, the left-hand row is pushed downward one step, the uppermost holder in the right-hand row is rapidly pushed to the left, and the right-hand row is pushed upward one step. Consequently, such an apparatus can serve one filling station only.

What is claimed is:

1. A sample collector comprising a rectangular base, spaces arranged in a first row and a second row on said base for receptacle holders, rectangular elongated receptacle holders arranged in a first row and a second row on said base in all of said spaces excepting one vacant end space in said second row of spaces, a plurality of open receptacles arranged in a row in each receptacle holder, means for moving a receptacle holder from one end position in said first row of receptacle holders to said vacant end space in said second row of spaces in a step by step movement, means for moving each row of receptacle holders separately in the longitudinal direction thereof, means for moving a receptacle holder from the opposite end position in said second row of receptacle holders to a vacant end space at the opposite end of said first row of spaces and means for depositing a fluid in said receptacles in said receptacle holder as it is moved step by step from said first row of receptacle holders to said second row of spaces.

2. A sample collector comprising a rectangular base, spaces arranged on said base in a first row and a second row for receptacle holders, rectangular elongated receptacle holders arranged in a first row and a second row on said base in all of said spaces excepting two, each receptacle holder containing a plurality of open receptacles arranged in a row, means for moving a receptacle holder in a step by step movement from one end position in the first row of receptacle holders to a vacant space in one end position in said second row of spaces, means for moving a receptacle holder step by step from the other end position of said second row of receptacle holders to a vacant space at the other end position of said first row of spaces, means for moving each row of receptacle holders separately in the longitudinal direction thereof and means for depositing a fluid in each of said receptacles in each of said receptacle

holders as it is moved step by step from one row of receptacle holders to a vacant position in a row of spaces.

3. A sample collector as defined in claim 2 in which the two named means for moving receptacle holders step by step operate synchronously and the means for moving the rows of receptacle holders longitudinally thereof operate synchronously in opposite directions.

4. A sample collector comprising a rectangular base, spaces arranged in a first row and a second row on said base for receptacle holders, rectangular elongated receptacle holders arranged in a first row and a second row on said base in all of said spaces excepting one vacant end space in said second row of spaces, a test tube rack carried by each receptacle holder, test tubes carried in each test tube rack, means for moving a receptacle holder from one end position in said first row of receptacle holders to said vacant end space in said second row of spaces in a step by step movement, means for moving each row of receptacle holders separately in the longitudinal direction thereof, means for moving a receptacle holder from the opposite end position in said second row of receptacle holders to a vacant end space at the opposite end of said first row of spaces and means for depositing a fluid in said test tubes as said receptacle holders are moved step by step from said first row of receptacle holders to said second row of spaces.

5. A sample collector comprising a rectangular base, spaces arranged on said base in a first row and a second

row for receptacle holders, rectangular elongated receptacle holders arranged in a first row and a second row on said base in all of said spaces excepting two, a test tube rack carried by each receptacle holder, test tubes carried by each test tube rack, means for moving a receptacle holder in a step by step movement from one end position in the first row of receptacle holders to a vacant space in one end position in said second row of spaces, means for moving a receptacle holder step by step from the other end position of said second row of receptacle holders to a vacant space at the other end position of said first row of spaces, means for moving each row of receptacle holders separately in the longitudinal direction thereof and means for depositing a fluid in each of said test tubes as said receptacle holders are moved step by step from one row of receptacle holders to a vacant position in a row of spaces.

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HUGO O. SCHULZ, *Primary Examiner.*