

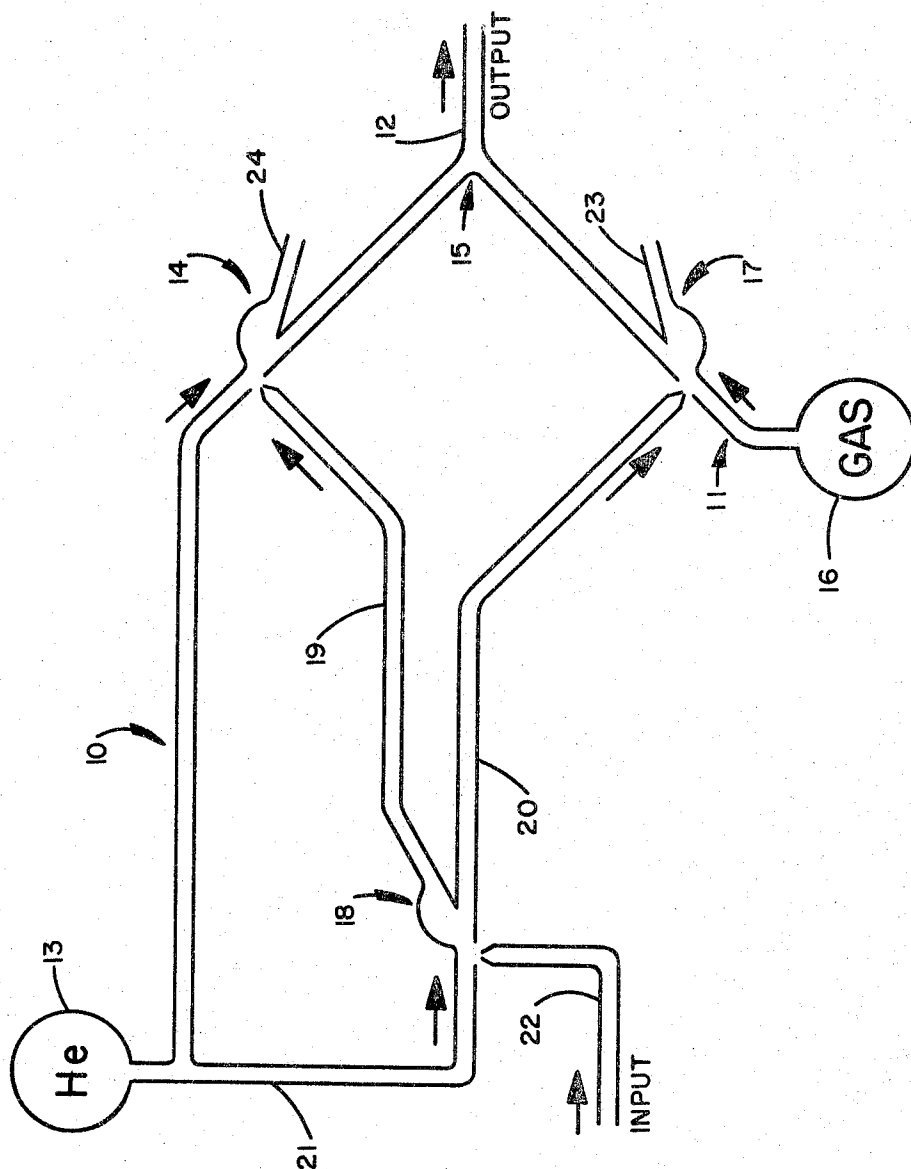
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FLUID SWITCH SYSTEM

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FLUID SWITCH SYSTEM

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2 Claims. (Cl. 137—81.5)

This invention relates to fluid logic systems on a dynamic continuous flow pattern basis. It has particular reference to means for selectively applying different fluid streams in a system to a single output.

One application for this system of this invention is in sample selection in chromatography. This may be on a discrete sample basis, or on a frontal analysis basis.

It is an object of this invention to provide a new and improved fluid switch system.

Other objects and advantages of this invention will be in part apparent and in part pointed out hereinafter and in the accompanying drawing, wherein:

The drawing is a schematic illustrated of a fluid switch system according to this invention.

In the drawing, there are two main fluid paths, one at 10 and one at 11. The flow of the fluid in this device is from left to right in the drawing, and the fluid paths 10 and 11 lead to a single output 12, indicated at the right of the drawing.

The fluid path 10 is supplied from a source 13 which may be, for example, helium in a chromatographic carrier gas situation. This supply gas is passed through a fluid logic gate 14 to a juncture 15 of the flow paths 10 and 11 as they combine to form a single output at 12.

The flow path 11 has its supply from a gas source 16. This may be a sample gas, in a chromatographic situation. This sample gas is led in along the path 11, through a fluid logic gate 17, to the juncture 15 and outward to the output 12.

Again at the left of the drawing, a control fluid logic gate 18 is provided with two outputs, one at 19 leading to the gate 14 as a control therefor, and one at 20 leading to the gate 17 as a control for it.

The control gate 18 is supplied from the source 13 by way of a path 21 which notably is upstream of the gate 14.

The control gate 18 is operated on the basis of an input control signal applied thereto through input passage 22.

Each of the gates 14, 17 and 18 may be called mono-stable fluid logic flip-flop units, that is, to say, that there is a normal flow therethrough which may be diverted to a different passage by a control signal and when the control signal is removed the normal flow reinstates itself.

Thus these units are mono-stable in that they return to their initial state after having been disturbed. They operate in the manner of a fluid logic diffusion unit, except that in this case, the main flow is not diffused but diverted to a different passage.

If there is no input signal in the input passage 22, flow from the source 13 will pass directly through the gate 14 and into the output 12. Also from the same source 13, flow is passed through passage 21 directly through the gate 18 and into control passage 20 to apply itself to gate 17. The signal normally going directly through gate 17 from the source 11 will be diverted to a vent as at 23.

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Since in this instance there is no flow in the output 19 of the gate 18, the gate 14 is open, and allows flow passage directly therethrough to the output 12.

When a signal is applied to the input 22 the direct flow through the gate 18 is now diverted to the passage 19. This action diverts the flow in the gate 14 to a vent 24, and removes the control through the passage 20, from the gate 17.

Under this situation, that is, of a signal in the passage 22, flow from the source 13 is cut off at the gate 14 and the control in the passage 20 to the gate 17 is cut off at the gate 18.

Therefore, with the signal in the input 22 there is a flow from the source 16 through the gate 17 to the juncture 15 and the output 12 with no flow reaching the output 12 from the other source 13 at that time.

When the input signal in the passage 22 is removed, the gate 18 goes back to straight through flow, shutting off gate 17, and releasing gate 14. The initial condition is again re-established with the output consisting of flow from the source 13 through the gate 14.

This invention therefore provides a new and useful fluid logic switching system particularly applicable to sampling functions as, for example, in chromatographic systems.

As many embodiments may be made of the above invention, and as changes may be made in the embodiments set forth above without departing from the scope of the invention, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawing is to be interpreted as illustrative only and not in a limiting sense.

I claim:

1. A fluid logic switch system comprising a pair of fluid paths leading to a common output path, gating means in each path, and a single control gate for both said gating means, a supply connection for said control gate from one of said paths, and a control signal input path to said control gate.

2. A fluid logic switch for selectively controlling input from two separate fluid sources into a single output, comprising a first fluid path from one fluid source to said single output, a first mono-stable fluid logic flip-flop gating unit in said first fluid path, a second fluid path from a second fluid source to said single output, a second mono-stable fluid logic flip-flop gating unit in said second fluid path, a third mono-stable fluid logic flip-flop gating unit with one output applied as a control to said first flip-flop unit, and with another output applied as a control to said second flip-flop unit, a fluid path connection leading from a point in one of said fluid paths, said point being located prior to the flip-flop in said one of said paths, to said third flip-flop unit as a supply therefor, and a control signal input to said third flip-flop unit.

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