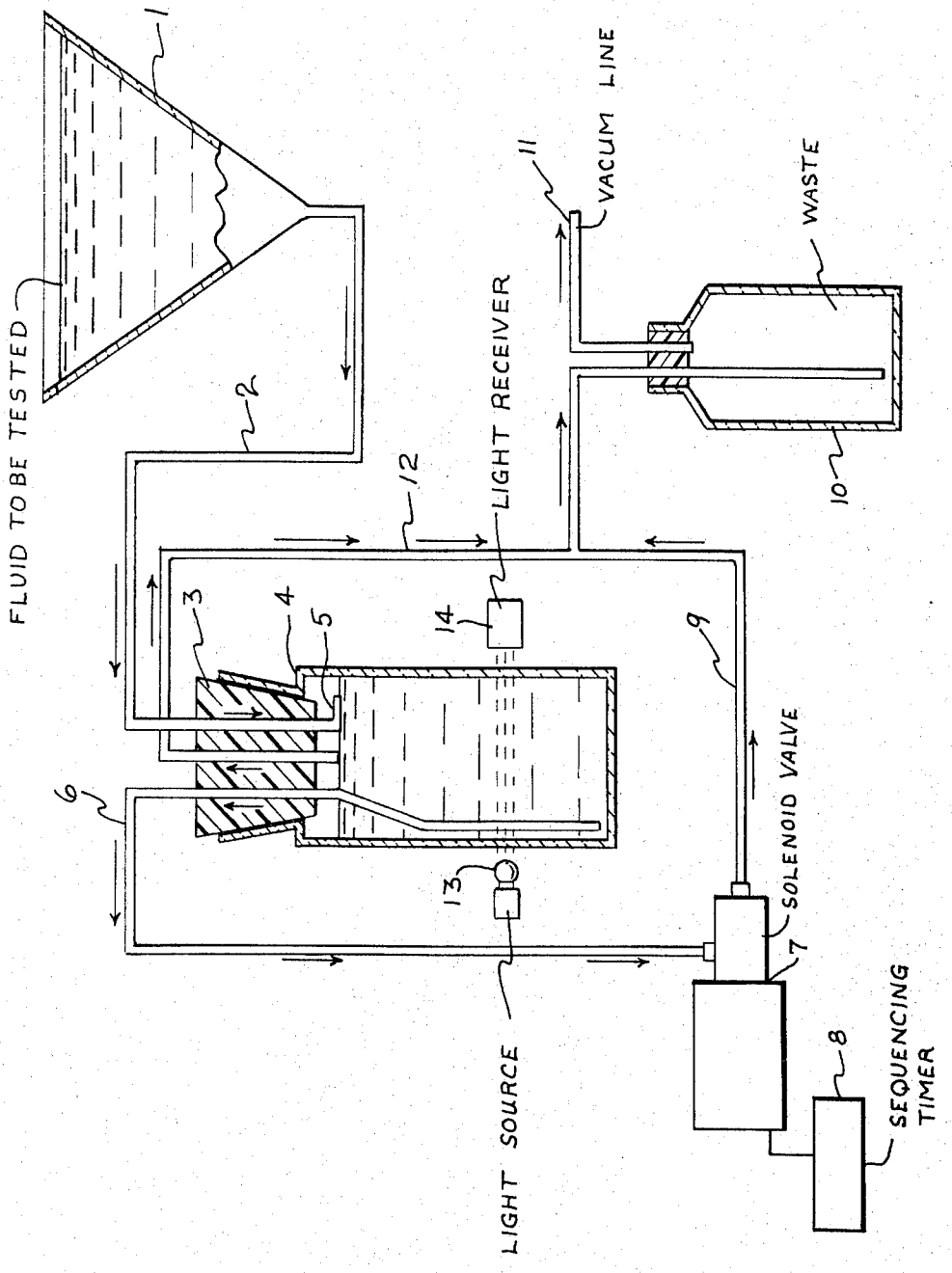
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SPECTROPHOTOMETRIC APPARATUS FOR RAPID ANALYSIS HAVING DEFLECTION MEANS TO PREVENT VORTEX FORMATION

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SPECTROPHOTOMETRIC APPARATUS FOR RAPID ANALYSIS HAVING DEFLECTION MEANS TO PREVENT VORTEX FORMATION

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to apparatus used to make rapid spectrophotometric analyses. Problems have been encountered in the use of apparatus of this type which caused difficulty in making readings or which made recordings unreliable. Also, use of the apparatus was slow, with mixing of the samples resulting from rapid spectrophotometric analyses.

In the drawing the single figure is a mechanical schematic diagram of the invention.

A fluid to be tested is poured into funnel container **1**. Line **2** leads from the funnel through stopper **3** to transparent cuvette **4**. The end of line **2** is curved in substantially a right angular direction relative to the main section of the line as illustrated at **5** and preferably terminates adjacent to the top of cuvette **4**.

A drain line **6** leads from near the bottom of cuvette **4** to solenoid valve **7** which is energized as desired or programmed by timer **8**. Line **9** extends from solenoid **7** to near the bottom of waste jar sediment trap **10**. Line **11** is connected to a source of vacuum. An overflow line **12** extends from the near the top of cuvette **4** to waste jar **10** and may be conveniently connected into line **9**.

A source of light and a receiver are illustrated at **13** and **14** respectively.

A sample of a fluid to be tested is placed in funnel **1**. Vacuum in line **11** draws a vacuum in jar **10** and in overflow line **12** thus drawing a vacuum in cuvette **4** and line **2**. This vacuum "sucks" the fluid sample from funnel **1** to cuvette **4**.

It is important to note that fluid from funnel **1** will flow to cuvette **4** until the proper level of fluid is reached in cuvette **4**, as determined by the end of line **12**. Any surplus fluid will be drawn into waste jar **10** and out through vacuum line **11** when jar **10** is filled. Thus, funnel **1** is "pumped" completely empty with each sample, leaving no surplus fluid to mix wtih the next sample to be tested.

Once the sample is in cuvette **4** the relative clearness of the fluid may be determined by the amount of light traveling to light receiver **14** from light source **13** in a manner wall understood in the art.

Cuvette **4** is emptied by opening solenoid valve **7** thus allowing the vacuum to exahust the cuvette through lines **6**, **9**, jar **10** and line **11**.

It is important that fluid from line **2** not be introduced straight down into cuvette **4**. A baffle, curved end **5** on line **2**, or other means may be used. If fluid from **1** is entering cuvette **4** from a straight downwardly extending line a vortex, or a pocket of air, will be formed between light source **13** and receiver **14** thereby affecting light transmissivity and making the readings fluctuate or otherwise unreliable. A simple bend at **5** deflects the fluid entering the cuvette thereby avoiding fluctuating or unreliable readings.

I claim:

1. Spectrophotometric analysis apparatus comprising fluid line means to introduce a fluid to be analyzed into a substantially transparent cuvette, deflection means for said fluid line means to prevent formation of a vortex or such disturbance in the fluid, overflow line means to automatically remove fluid above a predetermined level in said cuvette and drain line means to drain said cuvette when desired.

2. Apparatus as in claim **1** and container means connected to said fluid line means to supply a sample of fluid to be analyzed to said cuvette, and a vacuum line connected to said overflow line means to thereby withdraw the entire sample of fluid from said container means and to remove the excess, if any, to the level of said overflow line means.

3. Apparatus as in claim **2** and a waste container sediment trap connected in said vacuum line, said waste container being sealed and having an inlet extending to a relatively low point therein and an outlet extending to a relatively high point therein and connected to said vacuum line.

4. Apparatus as in claim **3** and a drain line extending, at one end, from adjacent to the bottom of said cuvette, a valve in said line, said line extending to and being connected to said vacuum line.

5. Apparatus as in claim **4** wherein the connection to the vacuum line is at a point ahead of the waste container sediment trap.

6. Apparatus as in claim **4** wherein said valve is operated by a solenoid and opened as pre-programmed by a sequencing timer.

7. Apparatus as in claim **1** and a light source and light receiver on substantially opposite sides and substantially transparent cuvette at an elevation below said fluid line means which introduces the fluid to be analyzed whereby light rays pass through said cuvette uninterrupted by fluid coming into said cuvette through said fluid line means and said deflection means.

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