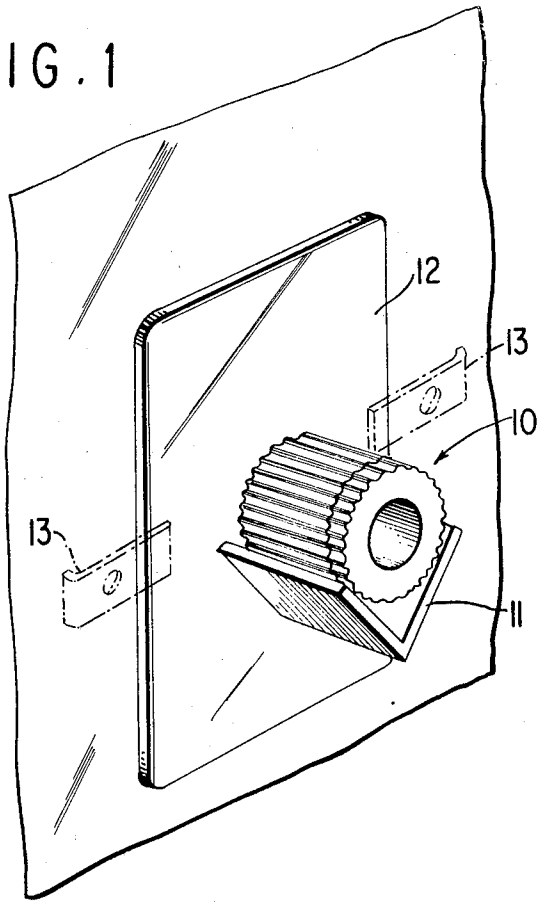
350-319 CROSS REFERENCE

July 28, 1970 P. A. WILKS, JR 3,521,964

SELECTIVELY ASSEMBLABLE ABSORPTION CELL

Filed Oct. 27, 1967

FIG. 1



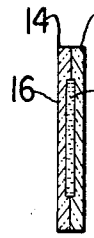


FIG. 3

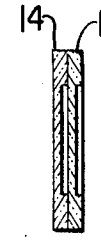
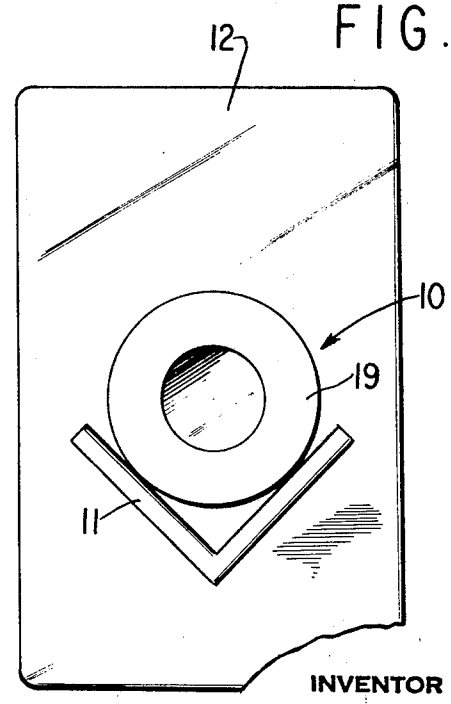


FIG. 4

FIG. 5



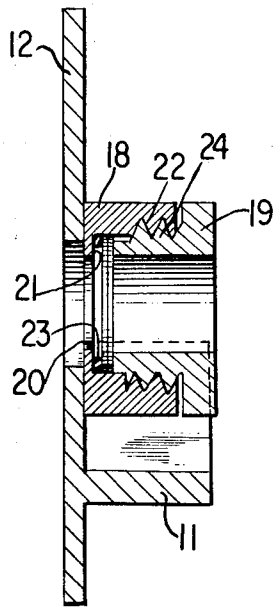


FIG. 2

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3,521,964

SELECTIVELY ASSEMBLABLE ABSORPTION CELL

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Int. Cl. G01n 1/10, 21/00
U.S. Cl. 356—246 3 Claims

ABSTRACT OF THE DISCLOSURE

A liquid sample holder for spectrophotometers wherein a pair of optically transparent windows, each having a depression in one face thereof, may be assembled in any one of several positions in a two-piece separable holding unit to provide various pathlengths.

The present invention relates to an absorption cell for spectrophotometers, more particularly, to an arrangement for providing a variety of pathlengths in a liquid sample holder.

Spectrophotometers have a wide variety of uses in both university and industrial classrooms. The spectrophotometers may be used to analyze liquid, gases or solid samples. A wide variety of accessories must be employed for holding the different forms of sample. To properly equip such spectrophotometers was expensive since a substantial supplementary investment was usually necessary to acquire new sample accessories to handle only the classical variety of problems. The liquid sample holders were rather inflexible since in order to obtain different pathlengths for the samples, a number of different structures were usually employed. Such structures not only added to the total investment in spectrophotometers but were generally cumbersome and complicated in structure so that they could not be quickly and accurately handled in the laboratory.

One of the objects of the present invention is to provide an improved sample holder for spectrophotometers.

Another of the objects of the present invention is to provide a sample holder wherein the pathlength therethrough may be selectively varied.

In one aspect of the present invention the absorption cell or liquid sample holder may comprise a pair of optically transparent windows formed of a material with each window having a circular depression in one face thereof and the other face flat. Two-piece separable holding means are provided for holding each pair of windows in one of a number of different assembled relationships. The windows may be assembled with both depressions against each other, both depressions away from each other or with a depression of one window against a flat surface of the other window. Thus, by selecting the assembly relationship with a pair of windows, different pathlengths through the assembled windows may be readily provided.

Other objects, advantages and features of the present invention will be apparent upon reference to the accompanying description when taken in conjunction with the following drawing, which is exemplary.

In the drawings:

FIG. 1 is an overall perspective view of the liquid sample holder of the present invention in position on a spectrophotometer;

FIG. 2 is a vertical sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is a vertical sectional view showing the windows being positioned with their depressions against each other;

FIG. 4 is a perspective view similar to that of FIG. 3 but showing the windows assembled in another position; and

FIG. 5 is an elevational view of the positioned holder of FIG. 1.

Proceeding next to the drawings wherein like reference symbols indicate the same parts throughout the various views a specific embodiment of the present invention will be described in detail.

The sample holder according to the present invention is indicated generally at 10 in FIG. 1 and is illustrated as being mounted directly in the spectrophotometer on a cell slide **11** mounted on a backing plate **12** and secured to the spectrophotometer by clamps indicated at **13**.

The sample holder is in the form of an absorption cell and comprises a pair of optically transparent windows **14** and **15** shown in FIG. 3 with each window having a flat or back surface **16** and a circular depression **17** in the other face thereof. The depression, for example, may have a depth of 0.025 mm. The windows are formed of an optically transparent material which may be of a suitable material, for example, silver chloride. The windows are assembled in a holding structure comprising a holding piece **18** and a locking or retaining piece **19**. The holding piece **18** is substantially cylindrical in form and has an internal flange **20** at one end thereof to define an annular seat **21**. The other end of the holding piece **18** is provided with internal threads **22**. The windows are positioned against a rubber O-ring **23** which is mounted against the seat **21** and then held in position by the locking piece **19** having threads **24** which are engageable with the threads of the holding piece **18**.

The holder pieces **18** and **19**, as an example, may be made of a plastic material "Delrin," a trademark of Du Pont for a polyformaldehyde. When the two windows are positioned into the holder piece as shown in FIG. 2, the locking piece is then screwed in to form a seal. The characteristic of silver chloride of the windows is such as to insure sealing under these conditions. The assembled holder can be used without a beam condenser.

When the windows are assembled in the front-to-front position as shown in FIG. 3, the two depressions are against each other and the pathlength through the assembled windows will be twice the depth of a depression.

In FIG. 4 a depression of window **14** is positioned against the rear or back face of window **15** and the sample would be enclosed therebetween whereby a pathlength equal to the depth of the depression is provided.

The windows of the present invention may also be placed back-to-back, that is, both depressions away from each other, and the two rear faces in contact so that the windows are assembled as two flats. These assembled positions as described above thus provide three pathlength variations attained merely by positioning of the windows with respect to each other and then assembling the windows in the separable two-piece holder.

Thus it can be seen that the present invention has provided a simple and low cost spectrophotometer accessory in the form of a sample holder. The holder has a variety of pathlengths which may be achieved merely by disassembling the two-piece holder and repositioning of the windows therein. The disclosed accessory adds suitably to the flexibility and adaptability of a spectrophotometer without incurring substantial additional investments.

It will be understood that various details of constructions and arrangements of parts can be changed without departing from the spirit of the invention, except as defined in the appended claims.

What is claimed is:

1. In a sample holder for spectrophotometers, a plastic absorption cell comprising two threadedly connected tubu-

lar parts, one of said parts having an internal annular flange at one end thereof to form a seat, and the other of said parts extending into said first part and terminating short of said flange, a pair of circular optically transparent window discs each having a first side and a second side, and said first sides having a circular depression in the face thereof, the depressions being similar, of equal depth and axially aligned, said windows being selectively arranged in flat abutting relationship with the first side of one window abutting either the first side or the second side of the other window in said seat whereby liquid samples may be so contained in said depressions to provide varying desired pathlengths through said assembled windows.

2. A sample holder according to claim 1 wherein said seat is flat and accommodates an O-ring therein for sealingly engaging said windows therein.

3. In a sample holder as claimed in claim 2 with each depression having a depth in the range of 0.025 mm. whereby pathlengths in the range of 0.050 mm. and 0.025 mm. are formed.

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