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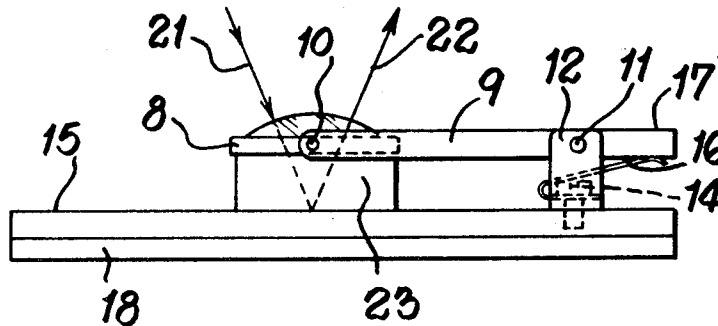
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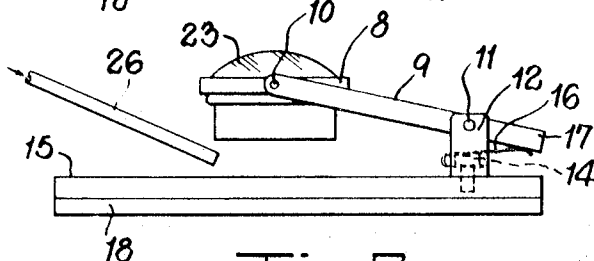
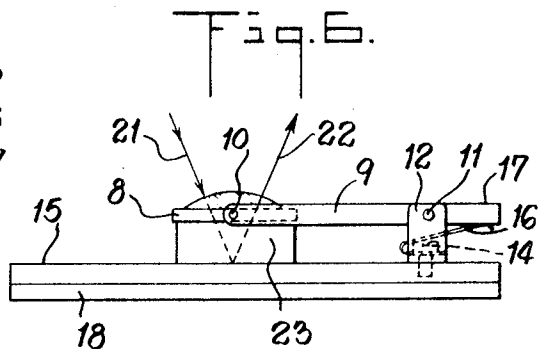
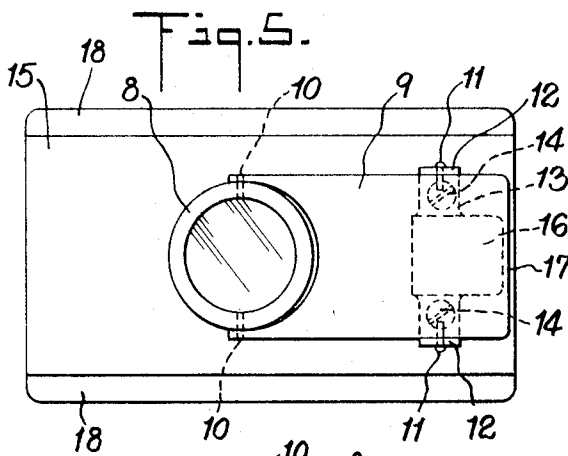
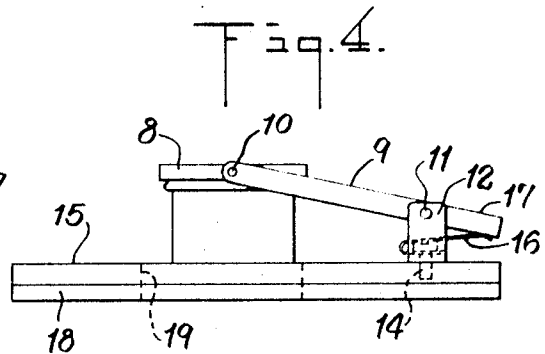
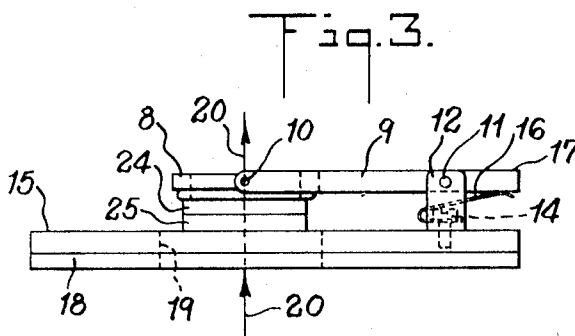
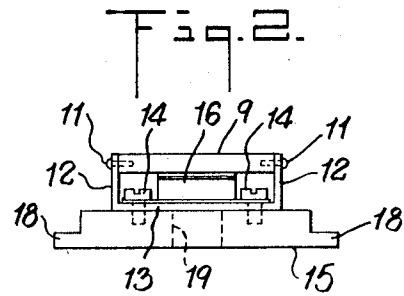
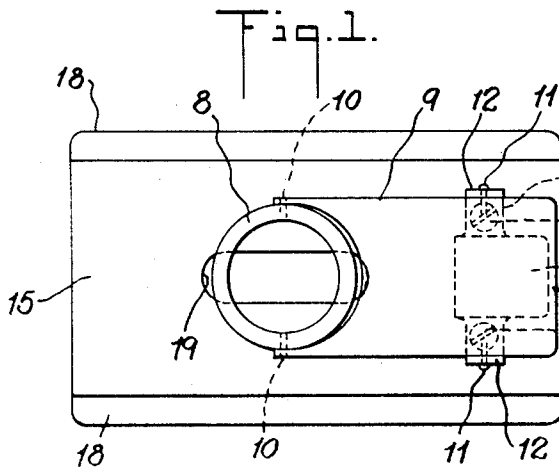
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[54] **SAMPLE HOLDER WITH PIVOTALLY MOUNTED
 RETAINING MEMBER**
7 Claims, 7 Drawing Figs.

[52] U.S. Cl..... 356/244,
 350/92, 350/239
 [51] Int. Cl..... G01n 1/28,
 G02b 21/34

ABSTRACT: A sample holder for use with a spectrometer, gas chromatograph, optical analyzer, or other analyzing instrument, and comprising a spring loaded arm with a pivotably mounted sample retainer mounted on a base.





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SAMPLE HOLDER WITH PIVOTALLY MOUNTED RETAINING MEMBER

This invention relates to a holder for use with a spectrometer, gas chromatograph, optical analyzer, and other analyzing instruments, and more particularly to a holder for holding samples, such as films, crystals, fluids, and condensed gases, for analysis.

In the past sample holders which were available could only be used with a limited number of types of samples and sizes of samples, and this necessitated that an experimenter obtain a separate sample holder for each of the various types or sizes of samples to be analyzed.

In addition, in the past when an experimenter was using a gas chromatograph for analysis, the experimenter could only gather one sample at a particular temperature with each run of an experiment.

This invention is a sample holder for use with a spectrometer, gas chromatograph, optical analyzer, or other analyzing instrument, and comprises a spring loaded arm with a pivotally mounted sample retainer mounted on a base.

One of the objects of this invention is to provide a sample holder which may be used for a large number of types and sizes of samples, thereby eliminating the need for a separate sample holder for each type and size of sample to be analyzed.

Another object of this invention is to provide a simplified holder for holding samples of various materials for analysis.

Still another object of this invention is to provide a device which may be used in conjunction with a gas chromatograph, or similar instrument, in a simplified manner to gather a number of samples of gases, at various peaks, temperatures, or other variables, as required by the experimenter, and to condense those gases in a simplified manner, in one run of an experiment and without the necessity of rerunning the experiment in order to obtain various samples, each retained in a separate sample holder, at the peaks, temperatures, or other variables, desired for each of the various samples.

Still another object of this invention is to provide a device which may be used to hold various types and sizes of liquid and gas cells containing samples, in addition to holding directly a large number of types and sizes of samples.

These and other objects of the invention will appear from time to time as the following specifications proceed and with reference to the accompanying drawings wherein:

FIG. 1 is a plan view of the invention;

FIG. 2 is an end elevational view of the invention;

FIG. 3 is a side elevational view of the invention, shown retaining a sample;

FIG. 4 is a side elevational view of the invention shown retaining a sample of a different size than the sample shown in FIG. 3;

FIG. 5 is a plan view of the invention in an alternate embodiment;

FIG. 6 is a side elevational view of the invention in the alternate embodiment as shown in FIG. 5;

FIG. 7 is a side elevational view of the invention in the alternate embodiment as shown in FIG. 5, with the exit needle of a gas chromatograph, or similar instrument, shown inserted between the sample holder and the base.

Referring to the drawings in which the same parts have been given the same numerals in the several FIGS.:

The sample retainer 8, which is here shown in the form of a ring but which can take any desired shape, is pivotally mounted on an arm 9 by means of pivot members 10. The arm 9 is pivotally mounted by means of pivot members 11 to the ears 12 of a bracket 13. Bracket 13 is mounted by means of screws 14 to a base 15. Arm 9 and sample retainer 8 are biased towards base 15 by means of spring 16 which exerts an upward force on the end 17 of arm 9. Base 15 is provided with mounting means 18 which are of the width and thickness required for positioning in the particular spectrometer, optical analyzer, or other instrument for which the sample holder is to be used, and will vary depending on the particular instrument for which the sample holder is manufactured, to conform to the mount provided by the manufacturer of the particular

spectrometer, optical analyzer, or other instrument. Of course, the sample holder could be manufactured with the base being an integral part of the spectrometer, optical analyzer, or other instrument.

In FIGS. 1, 2, 3, and 4, base 15 is provided with a slot 19 through which radiation or light waves may pass, as shown by arrows 20 in FIG. 3. The slot 19 is preferably located in axial alignment with the sample retainer 8.

In FIGS. 5, 6, 7, base 15 is not provided with a slot, but instead the area of the base 15 beneath or opposite the sample retainer 8 is polished or otherwise made reflective, so as to reflect radiation or light waves. In FIG. 6 an incident radiation or light wave 21 is shown passing into a crystal 23, being reflected out through the crystal 23, and emerging as reflected radiation or light wave 22.

In using this invention with a spectrometer, optical analyzer or other instrument where radiation or light waves are to pass through the sample to be analyzed and into the instrument, the sample holder will generally be first positioned in the particular instrument being used, with the slot 19 in line with the radiation or light wave detection portion of the instrument, the end 17 of arm 9 is then pressed towards base 15, thereby moving the sample retainer 8 away from the base 15, and the sample is then inserted between the base 15 and the sample retainer 8, in the position desired. The end 17 of arm 9 is then released, thereby moving the sample retainer 8 towards the sample, shown as crystals 24 and 25 in FIG. 3, and the base 15, resulting in the sample being retained between the base 15 and the sample retainer 8. The sample retainer 8 may be provided with a resilient material on the surface of the sample retainer 8 which comes into contact with the sample, so as to prevent gouging or scratching of the sample and also to aid in gripping the sample. The sample may be of any thickness within the limits of travel of the sample retainer 8. Film material, crystals, liquid and gas cells containing samples, and other materials may be thus positioned and held.

Where the sample is a liquid, the liquid may be placed between the two adjacent surfaces of two crystals, 24 and 25, for analysis.

Where it is desired to use this invention with an instrument where reflective radiation or light waves are required, the alternate form shown in FIGS. 5, 6, and 7 will be used. Here the base 15 does not have a slot, but instead the area of the base 15 beneath or opposite the sample retainer 8 is polished or otherwise made reflective. The sample is placed between the base 15 and the sample retainer 8 in the same manner as previously indicated for the base with a slot. In this case, however, the invention will generally be used in conjunction with an optical bench to focus the radiation or light waves and pass the waves through the analyzing instrument.

The alternate form as shown in FIGS. 5, 6, and 7 may also be used with a gas chromatograph. When used with a gas chromatograph, the invention will have affixed to the sample retainer 8 a crystal 23, as shown in FIG. 6. When so used, the end 17 of arm 9 is pressed towards the base 15, thereby moving the sample retainer 8 and affixed crystal 23 away from the base 15. This will provide a space between the crystal 23 and the base 15 into which the exit needle of a gas chromatograph 26 may be introduced, as shown in FIG. 7. The base 15 will in this case be made preferably of a material such as stainless steel and will be at a temperature lower than the temperature of the gas emitted through the exit needle of the gas chromatograph. Provided that the base 15 is of sufficiently low temperature, the gas emitted through the exit needle of the gas chromatograph will condense on the base 15. The exit needle of the gas chromatograph 26 is introduced into the space between the crystal 23 and the base 15 at a specific peak, as determined by the experimenter. The gas will condense on the cold base 15, and the crystal 23 will be lowered onto the condensed gas by releasing end 17 of arm 9. The condensed gas is thereby trapped between the crystal 23 and the base 15, and is ready for analysis by the experimenter. In the same run of the experiment, the experimenter may trap gases emitted at addi-

tional peaks by the gas chromatograph. The condensed gases thus trapped may be analyzed in the same manner as previously indicated for the use of the alternate form.

In a similar manner, the invention may be used in conjunction with a distillation or similar instrument.

While different embodiments of the invention have herein been shown and described, it may readily be understood that various modifications and variations in the invention may be attained without departing from the spirit and scope of the novel concepts thereof, as defined by the claims appended hereto.

I claim:

1. A sample holder comprising:

a base;

an arm pivotally mounted on said base;

a sample retainer pivotally mounted on said arm; and,

means for biasing the sample retainer toward the base, so that a sample retained is held between the sample retainer and the base; the sample retainer having a configuration such that a sample may be analyzed through the sample retainer, and the sample retainer being pivotally mounted on the arm whereby samples of different sizes may be

held in the sample holder.

2. A sample holder as claimed in claim 1 wherein the base is provided with a slot, which said slot is located in alignment with the sample retainer to permit the passage of radiation through the base and the sample retainer.

3. A sample holder as claimed in claim 1 wherein at least a portion of the area of the base in alignment with the sample retainer is reflective.

4. A sample holder as claimed in claim 1 wherein the base is provided with mounting means for mounting the sample holder in an analyzing instrument.

5. A sample holder as claimed in claim 1 wherein the means for biasing the sample retainer toward the base comprises a spring.

6. A sample holder as claimed in claim 1 wherein the sample retainer is provided with a resilient material on the surface adjacent to the base to aid in gripping the sample.

7. A sample holder as claimed in claim 3 wherein the sample retainer is provided with a crystal affixed to the sample retainer beneath which the sample is retained.

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