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FLUSHING VALVE FOR GAS COLUMN

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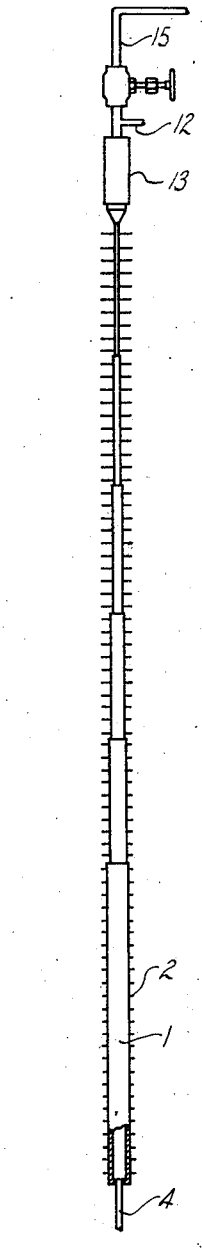


Fig. 1

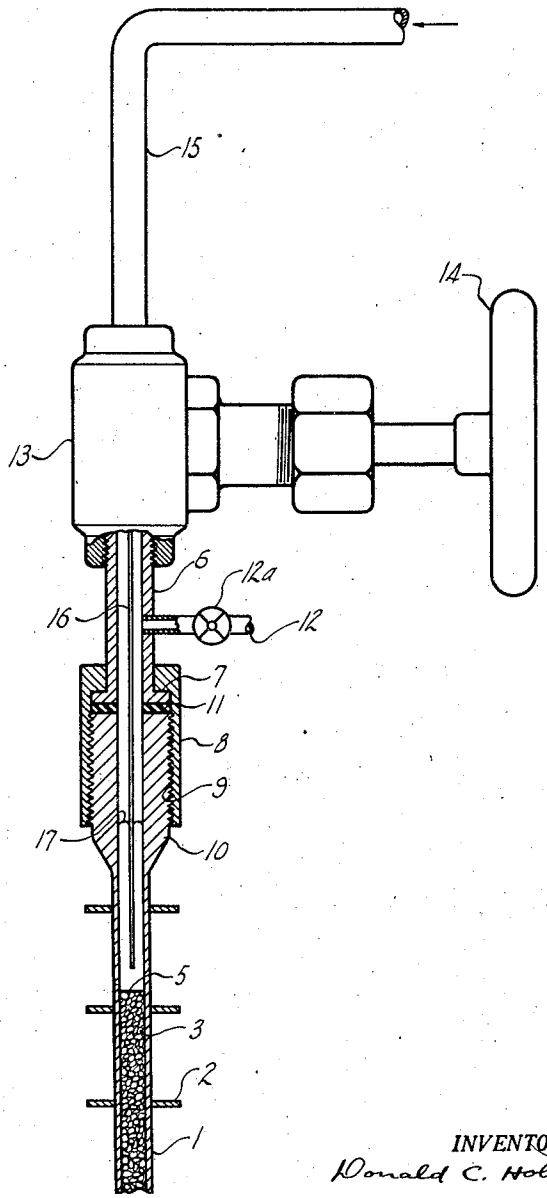


Fig. 2

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FLUSHING VALVE FOR GAS COLUMNS

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2 Claims. (Cl. 183—4)

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This invention relates to flushing systems for gas fractionating columns, and it is among the objects thereof to provide a valve structure adapted to be connected to the column which is especially adapted for the admission of gases to flush out the column after use.

Fractionating columns employing activated cocoanut charcoal for analyzing gas samples, which are admitted at one end of the column and forced out by heat and mercury vapor through the other end of the column, have been recently developed, and the present invention is especially adapted to flush out the residue of the sample, or the mercury vapor, after each sampling operation.

The invention will become more apparent from a consideration of the accompanying drawing constituting a part hereof, in which like reference characters designate like parts and in which:

Fig. 1 is a front elevational view partially in section of a fractionating column and flushing valve embodying the principles of this invention; and

Fig. 2, an enlarged front elevational view partially in section of the flushing valve mounted on the reduced end of the fractionating column.

In Fig. 1, the numeral 1 designates a column having radial fins 2 to provide a maximum surface area for the application of heat to the column, which is applied progressively from the one end to the other of the column as by a circular heater (not shown), or in any other suitable manner. The column is filled with an adsorbent material, such as activated cocoanut shell charcoal 3, and the gases are admitted through the inlet conduit 4 at the bottom of the column and are adsorbed by the charcoal throughout the length of the column.

As shown in Fig. 2, the charcoal level is designated by the numeral 5 directly beneath the flushing system, which consists of an adaptor 6 having a flange 7 forming a shoulder for a threaded sleeve 8 that coacts with the threads 9 of an enlarged portion 10 of the top of the column 1. An asbestos washer 11 is disposed between the juxtaposed faces of the column and adaptor to hermetically seal the joint.

Conduit 12 extends from the adaptor 6, through which the fractions flow from the column, to the volumeter and other auxiliary equipment employed in the gas analysis process, which is no part of the present invention.

A valve body 13 containing a valve of the usual construction controlled by a hand wheel 14 is

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threaded to the adaptor 6, one end of the valve housing being connected by conduit 15 to a source of flushing fluid such as hydrogen, air or other gases, preferably the former.

One side of the valve has a very small tube 16 extending into the gas column 1 to just above the charcoal level 5. The numeral 17 designates the mercury level in the tube after all of the gases of a given sample have been removed from the adsorbent material.

The operation of the above described flushing system is briefly as follows:

The gas column, filled with adsorbent material, is charged with the sample of the gases to be analyzed. By progressively heating the column, beginning at the bottom to the top, the gases are separated and the light hydrocarbons are initially driven off. During this process, valve 14 is closed and the separated gases pass through conduit 12 to the gas analysis apparatus. As the adsorbent material of the column is progressively heated, the gases will pass upwardly through the conduit 1 until the entire column has been exhausted.

The valve 14 is then opened, admitting the hydrogen, air or other gas through the inner tube 16 which drives out the last of the distillate that has collected in the space above the mercury level 17 and flushes this gas through the rest of the system.

This procedure not only recovers all of the distillate, but clears the system of all residual gases and vapors. After the system has been flushed, the gas analysis apparatus may be disconnected from the flushing mechanism by closing valve 12*a*, and the flushing gas is admitted to the column when the mercury level is lowered to the bottom preparatory to the admission of a new gas sample.

In this manner the adsorbent material of the column is flushed and cleared of any gases or vapors that may not have been removed during the distillation of the sample.

It is evident from the foregoing description of the invention that a flushing system as herein provided quickly and effectively clears gas analysis systems of residual gases, making it possible to obtain a complete analysis of the gas sample, in addition to providing a ready means of flushing the fractionating column of any gases, preparatory to the charging of a new sample to be analyzed.

Although one embodiment of the invention has been herein illustrated and described, it will be evident to those skilled in the art that various

modifications may be made in the details of construction without departing from the principles herein set forth.

I claim:

1. In adsorption fractionating apparatus of the type comprising, an elongated container charged with adsorbent material, having an inlet for passing gases into said container at one side of the adsorbent material to be adsorbed thereby and having means for releasing the adsorbed gases and an outlet for released gases from the opposite side of said adsorbent material, and having therein a sealing liquid for progressively submerging said adsorbent material as the adsorbed gases are removed therefrom; the improvement which comprises, a tube extending below the sealing liquid at its uppermost level for charging a gaseous medium into said container to replace the residual gases from said chamber and to flush out the adsorbent material after the sealing liquid has been removed therefrom.

2. In an adsorption fractionating apparatus of the type comprising an elongated container, charged with adsorbent material, and having an inlet for passing gases into said container at one side of the adsorbent material, to be adsorbed thereby and having an adapter connected to said chamber, said adapter having a valved outlet for gas released from the other side of said adsorbent material and a valved inlet, said container having therein a sealing liquid for progressively submerging said adsorbent material as the adsorbed gases are removed therefrom; the improvement which comprises, a tube connected to the valved inlet of said adapter, said tube extending below the sealing liquid at its uppermost level for charging a gaseous medium into said container to replace the residual gases from said chamber and to flush out the adsorbent material after the sealing liquid has been removed therefrom.

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