

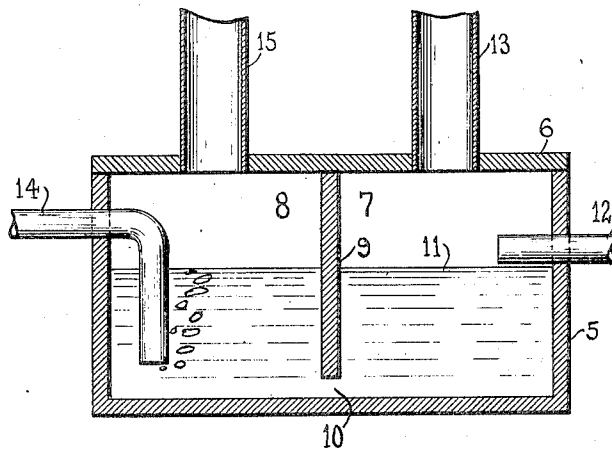
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METHOD OF CONDITIONING FLUIDS

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METHOD OF CONDITIONING FLUIDS

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This invention relates to a method of conditioning fluids. More particularly, the invention relates to conditioning of gaseous fluids supplied simultaneously to a carbon dioxide recorder or other device for comparative analysis of one fluid with respect to another.

In practically all types of gas analyzing devices wherein the test gas or other fluid is compared with a standard fluid it is necessary to have the former and the latter at like conditions of humidity. Heretofore such conditions have usually been provided either by completely drying both the test gas and the standard fluid or by subjecting both to like temperature conditions and saturating the same with water vapor. With such methods and apparatus it is necessary to supply additional drying material or water at more or less frequent intervals to insure accurate functioning of the devices.

An object of my invention is to provide an improved method of bringing a plurality of separate fluids to like conditions of humidity.

Another object is to provide novel apparatus for carrying out the method.

Another object is to provide a method and apparatus of the above character wherein the amount of manual attention required is minimized.

Another and more specific object is to provide such a method and apparatus wherein the humidifying medium employed is capable of use for an indefinite length of time without requiring replenishing.

Other objects and advantages of the invention will hereinafter appear.

The invention comprises essentially the employment of a body of hygroscopic substance, preferably a liquid, having portions with which the test gas and the standard fluid are respectively adapted to contact,—the arrangement being such that said test gas and standard fluid are maintained out of contact with each other.

The drawing illustrates schematically and diagrammatically one embodiment which my invention may assume in practice,—it being understood that the invention is susceptible of embodiment in various other forms with-

out departing from the spirit and scope of my invention as defined in the appended claims.

In the drawing, the numeral 5 designates a receptacle formed of any suitable material, said receptacle having a cover 6 tightly fitted thereto. Receptacle 5 is divided into a pair of compartments 7 and 8 by means of a barrier or partition 9, the lower end of said partition being spaced a short distance from the bottom of the receptacle to provide a communicating passage 10 between compartments 7 and 8.

Receptacle 5 is partially filled with a hygroscopic liquid 11, such, for example, as glycerin. The standard fluid, such as air, is admitted to compartment 7 through a pipe or conduit 12 in a manner to provide for contact of said fluid with the glycerin in said compartment; whereas a pipe 13 leads off from compartment 7 above the level of glycerin therein to conduct the standard fluid to the analyzing device. The test gas or other fluid to be analyzed is admitted to compartment 8 by means of a pipe or conduit 14, the latter being preferably adapted to discharge the test fluid below the level of the glycerin 11. The bubbling of the test fluid through the glycerin agitates the latter and causes mixing or circulation through passage 10 of the portions contained in compartments 7 and 8. A pipe 15 leads off from compartment 8 above the level of glycerin therein to conduct the test gas to the analyzing device.

The fluid conditioning means herein disclosed may be applied to comparative analyzing devices of the type disclosed in Patent No. 1,569,682, granted January 12, 1926, to E. X. Schmidt and myself, and to other devices wherein it is desired to supply the test gas and a standard fluid under like conditions of humidity or saturation with water vapor.

While I have specifically referred to the use of glycerin as a conditioning medium in the device herein disclosed, it is to be understood that other non-volatile hygroscopic liquids may be employed. Thus I may employ sulphuric acid as the conditioning medium, as well as certain deliquescent salts; these materials being less desirable in some cases,

however, on account of their corrosive tendencies.

Due to the fact that the carbon dioxide contained in the test gas is practically insoluble in glycerin or in the other hygroscopic liquids aforementioned, it is obvious that a proper continuous sample of the test gas will be supplied to the analyzing device.

10 In practice the hygroscopic liquid employed may comprise a solution of ninety per cent glycerin with ten per cent of water,—although in some instances pure glycerin may be employed. However, the liquid employed should be such as to provide for sub-
15 tracting moisture from both the test gas and standard fluid, or adding moisture to both, or subtracting moisture from one and adding moisture to the other,—depending upon the relative vapor pressures of the two fluids, whereby the latter will be humidified or sat-
20 urated to like degrees.

While I have shown pipe 14 discharging below the level of the liquid 11 for the purpose specified, it will be understood that if
25 the rate of flow of the test fluid is sufficiently slow the latter may be discharged into chamber 8 above the level of said liquid. Similarly, under given conditions it may be desirable to discharge both the test fluid and
30 the standard fluid below the level of the liquid, and this arrangement may be effected by obvious expedients.

In practice the inflowing test gas and the standard fluid will be at substantially equal
35 temperatures, whereas under conditions of relatively wide difference in the respective temperatures a suitable auxiliary heat exchanging device may be provided for effecting such temperature equalization.

40 What I claim as new and desire to secure by Letters Patent is:

1. The method of supplying test gas and a standard fluid for comparative analysis under like conditions of humidity or saturation,
45 which comprises jointly subjecting said gas and fluid to humidity control through contact thereof with a quantity of non-volatile hygroscopic liquid while preventing mixture of said gas and fluid with each other.

50 2. The method of supplying test gas, and air as a standard fluid, for comparative analysis under like conditions of humidity or saturation, which comprises jointly sub-
jecting separate flows of said gas and said
55 standard fluid to humidity control by effecting contact thereof with a common body of non-volatile hygroscopic liquid consisting of a solution of glycerin and water in the proportion of nine to one, respectively, while in-
60 suring against contact of said gas and said standard fluid with each other.

In witness whereof, I have hereunto subscribed my name.

ULRIC O. HUTTON.