

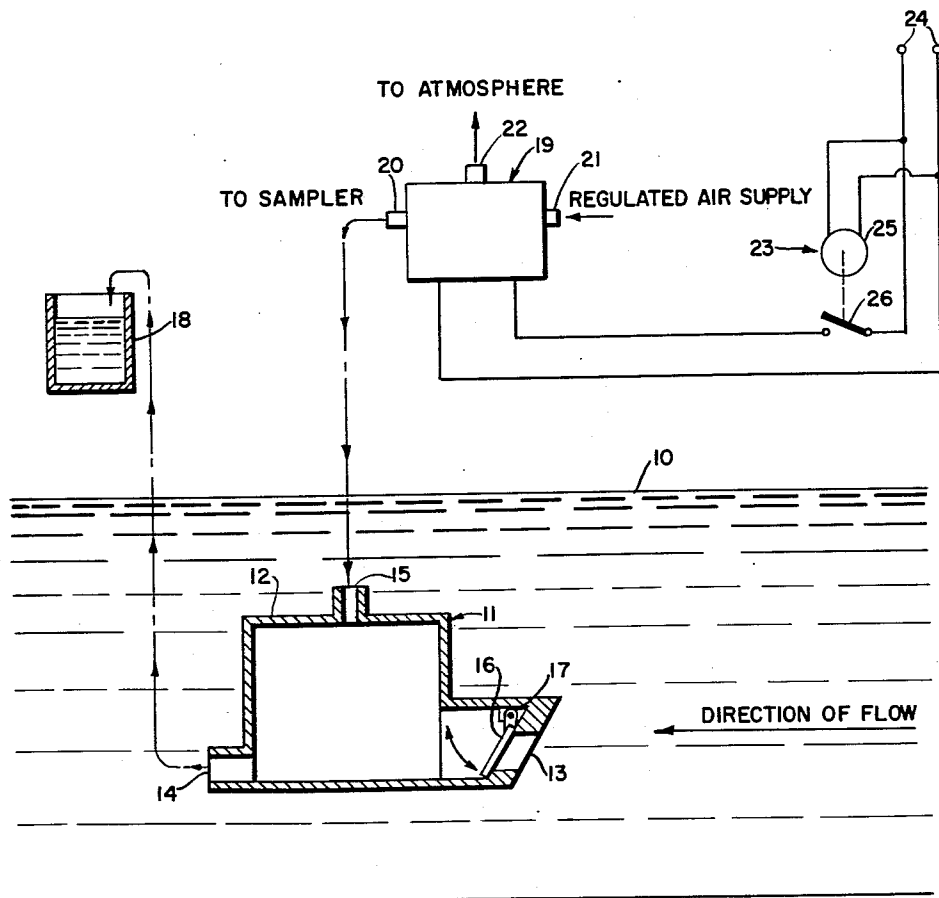
Feb. 4, 1964

C. A. SNYDER, JR

FLUID STREAM SAMPLER

Filed Jan. 8, 1962

3,120,128



INVENTOR
Charles A. Snyder, Jr.

BY *Holcombe, Wetherill & Brisebois*
ATTORNEYS

1

3,120,128

FLUID STREAM SAMPLER

Charles A. Snyder, Jr., 5 Grove Ave., Ticonderoga, N.Y.

Filed Jan. 8, 1962, Ser. No. 164,813

3 Claims. (Cl. 73-421)

This invention relates to an apparatus to obtain samples from a moving or stationary body of liquid at intermittent or timed intervals.

Heretofore, samples were manually taken, that is, a device manually operated was used to remove a single sample, which of necessity had to be within reach of the operator. This did not permit sampling from the center of the flow of a large body of dangerous liquid, such as foaming acid.

Certain mechanical samplers have been devised. These samplers depend on the flow of liquid to operate the sampling device, or, they depend on a jet principle for the removal of the sample, which is not a positive method of removal and is subject to becoming clogged and therefore inoperative, or they depend on the use of capillary tubes which also have the disadvantage of becoming clogged.

It is an object of the present invention to provide a sampler that may be used in either static or flowing streams and that may be operated at a position remote from the actual sampling device.

It is also an object of the present invention to provide a sampler that may be used in either a static or moving stream and will sample liquids, slurries, solids in suspension in the liquid and emulsified solutions.

It is still another object of the sampling device, that samples of various sizes may be taken.

These and other objects and advantages will be apparent to one skilled in the art from the preferred example described in the following specification and from the drawings, wherein:

The figure is a schematic drawing illustrating the operation of the sampler.

The body of liquid 10 to be sampled has the sampler 11 submerged therein. This comprises a body portion 12 having a liquid inlet 13 and a liquid outlet 14 thereon. The gas inlet 15, preferably near the upper portion thereof admits gas to control the expulsion of the sample through the outlet 14. The inlet 13 has the flapper valve 16 pivoted at its upper end 17 adjacent to the inner surface of the inlet 13. The outlet 14 is connected by a suitable conduit (not shown) to a sample receiving receptacle 18.

A sample control device 19 comprises a three-way solenoid valve, one outlet port 20 being connected to the port 15 of the sampling devices. The inlet port 21 is connected to a regulated air supply under pressure (not shown). The third port 22 is open to the atmosphere. A timing device 23, to control the solenoid valve comprises electrical leads 24, 24 to a suitable source of electric power, which may be either alternating or direct current. These leads are controlled through the timer 25 so as to close the switch 26 at appropriate times to operate the solenoid valve 19, which in turn operates the sampling device 11.

In operation, the sampler 11 is placed within the liquid to be sampled. This may be in a closed tank; it may be in a flowing stream; the liquid may be highly corrosive; or it may be a suspension of solids within the liquid. The solenoid valve 19 is so positioned as to open the port 20 to the atmosphere. This allows the liquid to enter the sampler through the liquid inlet 13 and flow past the flapper valve 16 to fill the body of the sampler. This liquid enters, due to the liquid head as represented by the differences in level between the inlet 13 and the surface of the liquid 10. The timing device

2

25 then operates the switching mechanism 26 to close the solenoid valve and connect the outlet port 20 with the inlet port 21. This allows the air pressure to enter through the port 15 and closes the flapper valve 16 and forces the contents of the body of the sampler through the outlet port 14 and the conduit attached thereto into the sample receiving receptacle 18. The timer then operates the solenoid valve to disconnect the compressed air supply and vent the port 20 to the port 22 which releases the pressure within the sampler and allows the flapper valve 16 to open and the liquid to flow into the sampler due to the difference in level between the surface of the liquid body 10 and the opening 13. The sampler is then ready to repeat the cycle and deliver another sample.

This sampler does not depend on liquid flow for operation and operates just as satisfactorily in a static tank as it does in a flowing stream. It does not depend for operation on capillary tubes and may be used on said liquid suspensions as sewage waste, paper mill screen room rejects and paper mills thick stock losses, which materials, of course, cannot be handled through capillary samplers. The amount of air admitted to the body of the sampler can expel all or a portion of the contents thereof, as desired, and this may be regulated by means of the solenoid valve 19.

The solenoid valve 19 may be automatically operated by the timer 23 or may be manually operated and supplies a positive lift to the samples leaving the sampler 11 and may therefore force this sample to any desired height, which function is not obtained by placing a suction on the outlet port 14 as the height to which samples may be lifted due to suction depends on the vapor pressure of the liquid being sampled.

The size of the sampler 11 is determined by the size of the samples to be delivered and the size of the outlet 14 depends on the type of sample to be obtained. The size of the inlet 15 depends on the speed desired for the sample discharged and the length of the run. The air pressure is determined by the height of the collecting tank above the sample chamber, the depth of submergence of the sample chamber, the velocity of the moving medium and its line friction.

While in the above description a preferred embodiment of the invention has been set forth for purposes of illustration, the invention is not limited thereby but is only limited by the scope of the claims appended hereto.

What is claimed is:

1. A sampler for use in a flow stream, comprising in combination:

(a) a sampler body having a liquid inlet controlled by an automatically closing valve on the up-stream side which is automatically opened by said stream, a gas inlet, a sample outlet, and

(b) a three-way valve connected to the gas inlet, to vent the sampler body to allow the filling thereof, to introduce air under pressure to expel the sample therefrom through the sampler outlet and to revert the sampler body to allow refilling thereof.

2. A sampler for use in a flow stream, comprising in combination:

(a) a sampler body having a liquid inlet controlled by an automatically closing valve on the up-stream side which is automatically opened by said stream, a gas inlet, a sample outlet,

(b) a solenoid three-way valve connected to the gas inlet, to vent the sampler body to allow the filling thereof, to introduce air under pressure to expel the sample therefrom through the sample outlet, and to revert the sampler body to allow refilling thereof,

3

(c) and timing means to control the said solenoid valve.

3. A sampler for use in a flow stream said device comprising:

(a) a sampler body having a liquid inlet with automatic closing means on the up-stream side which is automatically opened by said stream thereon, a sample outlet near the bottom of said sampler connected to a reservoir, an air inlet near the top of said sampler,

5

10

4

(b) means for admitting air under pressure to said air inlet to expel the sample therefrom, and to re-vent said sampler to allow refilling thereof with a subsequent sample.

References Cited in the file of this patent

UNITED STATES PATENTS

2,995,037	Parker	Aug. 8, 1961
3,015,957	Paulson	Jan. 9, 1962
3,039,309	Vesper	June 19, 1962