Nov. 3, 1936. W. S. RAINVILLE, SR 2,059,999

SAMPLER

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Fig. 1.

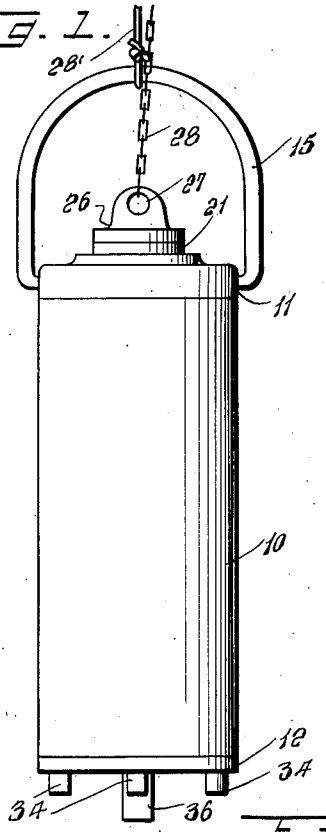


Fig. 2.

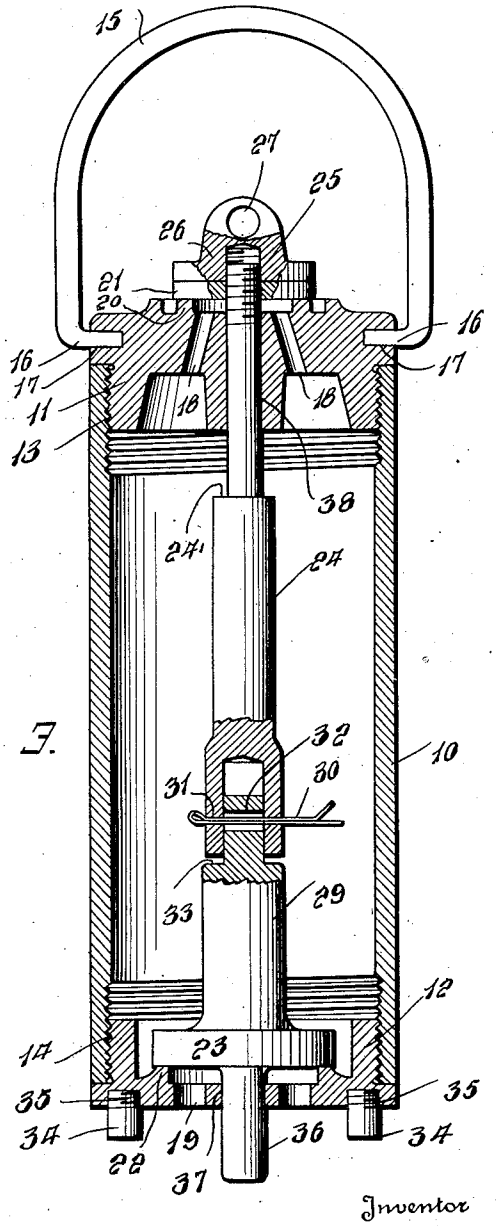
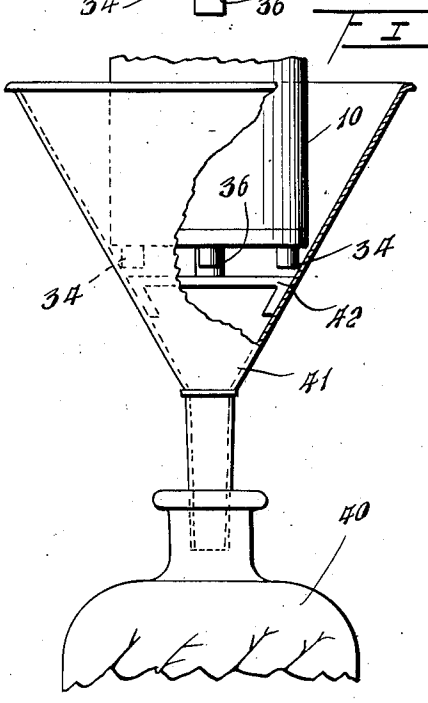


Fig. 3.



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SAMPLER

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4 Claims. (Cl. 137—18)

This invention relates to a sampler primarily adapted for extracting for sampling purposes, liquids, semisolids, fluent material or the like from various receptacles or containers such as bulk storage tanks, tank cars, tank ships, drums, barrels, cans and the like.

It is particularly aimed to provide a construction wherein the sample may be obtained at any desired depth within the container or receptacle and may be maintained sealed, a construction wherein the sample enters the device from the bottom, and a construction having upper and lower valves constructed and arranged so that they have relative movement to enable efficient seating of each of them.

The more specific objects and advantages will become apparent from a consideration of the description following taken in connection with accompanying drawing illustrating an operative embodiment.

In said drawing:—

Figure 1 is a view of the sampler in side elevation;

Figure 2 is a substantially central longitudinal sectional view through the sampler, on an enlarged scale, and

Figure 3 is a fragmentary view primarily in side elevation illustrating the method of emptying the sampler.

Referring specifically to the drawing wherein like reference characters designate like or similar parts and wherein the parts may be made of any desired materials and sizes, 10 designates a body, shell, or barrel of cylindrical or other desired form having upper and lower head or orifice plates at 11 and 12, respectively, screw-threaded as at 13 and 14 to said barrel interiorly of the latter. The device is adapted to be held or suspended by means of a handle or bail 15 having inturned ends 16 pivotally disposed in sockets 17 provided at diametrically opposite points in the head 11.

Said heads 11 and 12 have ports or orifices 18 and 19, extending therethrough respectively, being at any desired angle and of any desired number. The total area of the ports or orifices 19 is greater than the total area of the ports or orifices 18.

Said head 11 has an annular rib 20 on its upper surface which forms a seat for a disc valve 21, the engaging surfaces of which seat 20 and valve 21 are ground to insure a tight and sealing fit. Likewise, an annular rib or the like 22 rises from the head 12 and is engaged by a valve 23, with the engaged surfaces of the seat 22 and the valve 23 being ground to form a tight and sealing fit.

Valve 21 is adjustably screw-threaded onto a stem section 24 as at 25 and the screw-threads 25 are engaged by the screw-threads of a lock nut 26 contacting the valve 21. The lock nut 26 has an eyelet or the like as at 27 to which a flexible draw member 28, such as a cord or chain, may be attached. The adjustment of valve 21 enables the amount of slack between the operation of the upper and lower valves to be varied and so that wear may be compensated for.

Said valve 23 has a stem section 29 rising therefrom which is detachably connected by means of a cotter key 30 or the like to the lower end of the stem 24.

The shoulder 24' on valve stem 24 prevents the valves from being pulled out of their guides when the device is operated in taking a sample other than at the bottom of the container.

Said cotter key passes removably through openings 31 and 32 in the stem section 24 and 29, and the opening 32 is preferably enlarged and there is clearance as at 33, between the lower end of the section 24 and adjacent portion of the stem section 29. There is also slight clearance between the sections 24 and 29 for lateral motion. As a result a slip joint is provided between the stem sections 24 and 29 to enable relative movement of the valves 21 and 23 to always adapt themselves to their respective seats 20 and 22 to tightly engage and seal the same.

A plurality of equidistantly spaced legs in the form of studs 34 are screw-threaded at 35 to the lower head 12 and an extension or lug 36 depends from valve 23, passing slidably through an opening 37 in the head 12, and terminating below the lower end of the leg 34. The stem 24 slides through a bore 38 in the head 11.

It will be realized that when the device is lowered into a liquid by means of a flexible suspending member 28' attached to the bail or handle 15, the valves 21 and 23 will be and remain closed and sealed. When the bottom of the liquid is reached, the lug 36 will engage the bottom of the container, arresting the lowering of the lug 36 and permitting the remainder of the structure to lower so that the ports 19 will be opened, followed by the opening of the ports 18 as the slack in the slip joint is taken up. This permits the sampler to fill with liquid from the bottom through ports 19 as the air is permitted to escape through ports 18 at the top.

When the device is raised from the test container the valves close in the reverse order seal-

ing in the sample from the bottom of the container. On the other hand, if a sample is to be taken at any desired elevation above the bottom, the cable or element 28 is lifted so as to raise the valves 21 and 23 as a unit, uncovering the seats 20 and 22, permitting the air to escape from the top ports 18 as the liquid enters through the bottom ports 19. When the device is filled, tension on the cable or element 28 is released, permitting the valves 21 and 23 to re-seat themselves tightly against their respective seats 20 and 22, sealing in the sample from the desired test level. The device may be used for the sampling of liquids or materials of various characters, such as water, vegetable, mineral and animal oils, acids, alkalies, chemical solutions and the like, and may also be used to detect the presence of immiscible liquids, such as the presence of water under oil in a bulk storage petroleum tank or other container.

The sampler always fills from the bottom. It may be filled rapidly or slowly at the will of the user. This is as true in the case of bottom sampling as it is of taking samples at any other level in the container or receptacle. This is accomplished by the valve action of the device. The entrapped air may be exhausted with a rush, causing the sampler to fill from the bottom with a turbulence which will suck up particles of rust, sediment and so forth from the bottom of the container in order to determine their presence and nature; or the entrapped air may be exhausted slowly, causing a minimum disturbance of the liquid surrounding the sampler as it fills slowly from the bottom.

The device may be easily emptied for a sample without loss or spillage, the rate of discharge into the sample container being controlled by the rate of admission of air at the upper orifices 13 under the influence of the valve action.

The emptying operation is suggested in Figure 3 where a bottle 40 to receive the sample from the sampler, has a funnel 41 disposed in its neck and which funnel has a bar 42 disposed diametrically therein. Upon lowering the sampler into the funnel as shown in Figure 3, the lug 36 will engage the bar 42 arresting its movement while the body or shell 10 lowers with respect thereto thus unseating the vave and opening first the ports 19 and then the ports 18 so that the sample may flow from the ports 19 into the bottle.

Various changes may be resorted to provided they fall within the spirit and scope of the invention.

I claim as my invention:—

1. A sampler of the class described, having a body, upper and lower heads on said body provided with orifices therethrough, a valve for the orifices of the upper head, a valve for the orifices of the lower head, stem sections extending from said valves, a slip connection between said stem sections, comprising a fastening passing through openings in said sections, one of said openings being enlarged with respect to that portion of the key passing therethrough, said connection permitting raising movement of the lower valve relatively to the upper valve and simultaneous raising movement of both valves thereafter.

2. A sampler of the class described, having a body, upper and lower heads on said body provided with orifices therethrough, a valve for the orifices of the upper head, a valve for the orifices of the lower head, stem sections extending from said valves, said connection permitting raising movement of the lower valve relatively to the upper valve and simultaneous raising movement of both valves thereafter, a slip connection between said stem sections, and a lug depending from the lowermost valve to an extent below the remainder of the device for the purpose specified, and valve seats engaged by the valves being in the form of annular ribs about the orifices of the respective heads.

3. A sampler of the class described, having a body, upper and lower heads on said body provided with orifices therethrough, a valve for the orifices of the upper head, a valve for the orifices of the lower head, stem sections extending from said valves, a slip connection between said stem sections, and a lug depending from the lowermost valve to an extent below the remainder of the device for the purpose specified, and valve seats engaged by the valves being in the form of annular ribs about the orifices of the respective heads, a lock nut in engagement with the upper valve, said lock nut and upper valve being screw-threaded to the adjacent stem section, and an eyelet provided on said lock nut.

4. A sampler of the class described, having a body, upper and lower heads on said body provided with orifices therethrough, a valve for the orifices of the upper head, a valve for the orifices of the lower head, stem sections extending from said valves, a slip connection between said stem sections, and means adjustably mounting one of said valves so that the slack between their operation may be varied and wear may be compensated for.

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