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CHEMICAL FLOW CONTROLLER
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Fig. 1

Fig. 2

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This invention relates to a chemical flow controller, and more particularly to means for controlling the flow of a chemical treating agent to an oil and gas separator, oil measuring trap or any other means where a chemical liquid is to be mixed with the oil for treating purposes or the like.

One of the objects of the invention is to furnish an improved chemical flow controller adapted to intermittently feed a chemical treating agent to oil or the like, and capable of actuation by intermittently applied gas pressure.

With the foregoing object outlined and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawing, and more particularly pointed out in the appended claims.

In the drawing,

Fig. 1 is a diametrical vertical sectional view of my improved chemical flow controller.

Fig. 2 is a horizontal sectional view of the same, taken on the line 2—2 of Fig. 1.

Referring to the drawing, 1 designates a gas-tight tank preferably formed of metal and adapted to contain a pool 2 of the chemical liquid to be fed by the apparatus. 3 designates a plugged inlet through which the chemical may be introduced into the apparatus. 4 designates a tubular nipple through which gas under pressure is introduced into and discharged from the contained.

The parts 3 and 4 are preferably secured to the top 5 which is provided with a relatively large threaded opening for the attachment of a cap 5a supporting a rod guide 6. A centrally disposed rod packing means 7 depends from the cap immediately below the guide.

The bottom 8 of the tank is provided with a centrally disposed opening to receive a circular flange 8a arranged at the lower end of a cylinder 9 which is supported by the bottom and extends upwardly within the tank. A plate 9b which closes the bottom of the cylinder is secured in place by any suitable means such as screws 8c which pass through the plate and bottom 8 into the lower end of the cylinder.

A plunger or compound piston 10 is arranged to reciprocate in the cylinder, and is connected to the lower threaded end of a guide rod 11 which passes through the part 7 into the guide 6.

A coil spring 12 which yieldingly holds the piston in its uppermost position, is seated on a shoulder 9a within the cylinder and bears at its upper end against a disk 13 that is adjustable on the threaded portion of the rod 11 for the purpose of adjusting the force of the spring.

The piston has an enlarged head 14 and a reduced foot 15, the former travelling in a relatively large barrel below the shoulder 9a, and the latter travelling in a relatively small barrel 17 positioned at the lower end portion of the cylinder.

The upper end portion of the cylinder is provided with a longitudinal slot 55 to prevent gas from being trapped in the cylinder and interfering with the operation of the plunger, and to also allow gas pressure to act on the piston head 14.

A passageway 18 extends through the lower end portion of the cylinder and the plate 8b for conveying the chemical from the tank into the chamber 17, and the passageway is closed by a check valve 19 mounted on the plate 8b. The chemical is discharged from the chamber 17 through a passageway 20 which extends through the plate 8b and is connected to an outlet pipe 210 provided with a check valve 21 which allows the liquid to flow outwardly, but prevents liquid from flowing inwardly.

In operation, I prefer to use the apparatus in combination with the liquid transferring means shown in my application Serial No. 187,278, filed January 27, 1938. In that application, I have disclosed an oil and gas separator provided with a measuring chamber, and valves controlled by gas under pressure which in turn is controlled by a float in the measuring chamber. Such float can also be used to control the admission of the pressure gas into the nipple 4 of the present apparatus, so that a charge of chemical will be fed from the tank 1 at each cycle of the float.

The chemical thus discharged through the pipe 20b can be fed into the oil and gas separator, the measuring chamber, or to any other desired place.

In operation, assuming the parts to be in the positions shown in Fig. 1, the chemical can flow by gravity through the passageway 18 into the chamber 17, while the pressure gas is cut off from the tank 1. Then, when the pressure gas is admitted through the nipple 4, it will act upon the upper end portion 14 of the plunger to force the latter downwardly and discharge the chemical from the chamber 17 through the port or passageway 20. Of course, as the piston moves downwardly, the disk 13 will compress the spring 12, and therefore, when the gas pressure is cut off from the tank, the spring will act not only to restore the piston to its uppermost position, but
to assist in filling the chamber 17 with a second charge of chemical.

While I have disclosed what I now consider to be a preferred embodiment of the invention in such manner that the same may be readily understood by those skilled in the art, I am aware that changes may be made in the details disclosed without departing from the spirit of the invention, as expressed in the claims.

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

1. An apparatus of the character described, comprising a gas-tight tank, an upstanding cylinder positioned in the tank and secured to the bottom of the latter, means closing the lower end of the cylinder, said cylinder having a chamber at its lower end portion, a passageway placing the interior of the tank in communication with the bottom of said chamber, a check valve in said passageway for controlling the flow of liquid from the interior of the tank into the chamber, a passageway for discharging a liquid from the lower end of the chamber and provided with a check valve, a compound piston arranged to reciprocate in the cylinder and having an enlarged upper end portion, the lower end portion of the piston forming the top of said chamber, a guide rod for the piston, a spring in the cylinder surrounding the guide rod and adapted to yieldingly hold the piston in an uppermost position, a member mounted on the guide rod and bearing upon the upper end of the spring, the upper end portion of the cylinder being provided with means to permit gas under pressure introduced into the tank to act upon the enlarged upper end of the piston, and means for introducing gas under pressure into the upper end portion of the tank.

2. An apparatus of the character described, comprising a gas-tight tank having means at the upper end portion thereof for introducing gas under pressure into the tank, an upstanding cylinder secured to the bottom of the tank and arranged within the latter, said cylinder and tank forming an annular space to hold chemical liquid, means closing the lower end of the cylinder and provided with valve controlled passageways for admitting liquid from the tank into the lower end portion of the cylinder and for discharging liquid from the lower end portion of the cylinder, a compound piston arranged to reciprocate in the cylinder and having an enlarged upper end portion and a reduced lower end portion, the latter reciprocating in the lower end portion of the cylinder, a shoulder in the cylinder above the piston, a spring in the cylinder resting on the shoulder, a guide rod having its lower end portion secured to the piston and its upper end portion guided at the top portion of the tank, and a member adjustable lengthwise of the guide rod and bearing upon the upper end of the spring, and means at the upper end portion of the cylinder to permit gas under pressure introduced into the tank to exert pressure on the enlarged upper end portion of the piston.

3. An apparatus of the character described, comprising a gas-tight tank, an upstanding cylinder positioned in the tank and rigidly supported thereby, means closing the lower end of the cylinder, said cylinder having a chamber at its lower end portion, a passageway placing the interior of the tank in communication with the lower end of said chamber, a check valve in said passageway for controlling the flow of liquid from the interior of the tank to the chamber, a passageway for discharging liquid from the lower end portion of the chamber and provided with a check valve, a compound piston arranged to reciprocate in the cylinder and having an enlarged upper end portion, the lower end portion of the piston forming the top of said chamber, a guide rod for the piston, a spring surrounding the guide rod and adapted to yieldingly hold the piston in its uppermost position, a member mounted on the guide rod and bearing upon the upper end of the spring, the upper end portion of the cylinder being provided with means to permit gas under pressure introduced into the tank to act upon the enlarged upper end of the piston, and means for introducing gas under pressure into the upper end portion of the tank.

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