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SEPARATOR FOR GAS AND WATER.

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No model.
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To all whom it may concern:

Be it known that I, ALONZO J. SIMMONS, a citizen of the United States, residing at 8311 Kenwood avenue, Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Separators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to separators in general, and more particularly to that class employed in the separation of gas from water in combination with which it usually flows from the gas-well.

The object of the invention is to provide a simple and efficient separator and one which will be cheap of manufacture and positive of operation, the water-outlet from the separator being regulated by the column of water within the stand-pipe.

A further object of the invention is to provide an automatic relief-valve in which the parts will not be subject to the corroding effects of the gas-contaminated water and which corrosion under ordinary circumstances causes the valve to stick, and thus destroy the effectiveness of the apparatus.

Further objects and advantages of the invention will be apparent from the following specifications.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a side elevation of the complete apparatus. Fig. 2 is a vertical central section of Fig. 1. Fig. 3 is a bottom plan view of Fig. 1.

Referring now to the drawings, this separator comprises a stand-pipe or receiver 5, which is preferably cylindrical in form and is of sufficient height and diameter to insure the separation of the gas from the water in the descent of the mixture therethrough. To the lower end of the stand-pipe is secured a base 6, which is circular in form and has a circular extension 7 of greater diameter and which forms the base for the automatic relief-valve. This base 6 is secured to the lower end of the stand-pipe through the medium of a ring 8, which is screwed onto the lower end of the stand-pipe and to which ring the base is secured by means of bolts 9, as shown.

Upon the upper end of the stand-pipe 5 is screwed a cap 10, having a transverse horizontal partition 11, which rests upon the upper end of the pipe. Above this partition the cap is contracted transversely, as shown in Fig. 1 of the drawings, and this contracted portion is divided into two chambers by a vertical partition 12, these chambers being designated 13 and 14 in the drawings and having openings 15 and 16 in their bottoms through the partition 11 and into the enclosure of the stand-pipe. Screwed into the opening 16 is a nipple 17, which depends vertically and is adapted to perform the functions of a nozzle in directing the flow of the mixture of gas and water from the chamber 14 into the stand-pipe, this mixture being supplied directly from the well through a feed-pipe 18, leading from the well to said chamber. A gas-outlet pipe 19 communicates with the chamber 13 through a side wall thereof, as shown.

Mounted upon the extension 7 of the base 6 is a cylindrical valve-casing 20, having outwardly-directed flanges 21 and 22 at its upper and lower edges, respectively. This shell is disposed upon the extension 7 and has a head 23 at its upper end and resting on the flange 21. The shell, the head, and the base extensions are held in their proper positions by means of the bolts 24, passed through alining perforations formed in the flanges 21 and 22, the head 23, and the extension 7.

Upon the base 17 and between it and the shell 20 is disposed a disk of rubber 25, and within the shell 20 and resting upon this disk is a piston-valve 26, which is in the form of a cylinder having an open upper end and a re-entrant lower closed end, the disk being held upwardly at its center to lie within the re-entrant portion by means of a valve pad or
extension 27, which is secured over the rubber disk and to the central portion of the base of the piston-valve, as shown in Fig. 2 of the drawings.

5 In the inner periphery of the shell 20 is formed a broad channel which is covered by the piston-valve 26, and in this resultant chamber is disposed a packing 28, formed, preferably, in accordance with the invention set forth in United States Letters Patent No. 120,093, granted to me.

10 Centrally of the base extension 7 is formed a recess 29, which communicates with a passage 30, which leads radially and outwardly of the said base extension and communicates with a drain-pipe 31, which has threaded connection with its outer end. The valve pad or extension 27 acts to normally close or cover the recess 29 to prevent egress from the stand-pipe 5 by way of the passage 32, which leads from the center of the bottom of the stand-pipe to a point through the bottom of the base extension 7 midway between the center of the valve-casing and the periphery thereof.

15 When however, the valve pad or extension 27 is raised from the recess 29, there will be a flow of liquid through the passage 30.

An equalizing-pipe 35 communicates at one end through the top of chamber 13 and at its other end through the head 23, so that the pressure within the stand-pipe may be conveyed to the upper side of the piston-valve 26 to balance the pressure from the stand-pipe upon the lower end of the piston-valve.

20 The operation of the structure is as follows:

Fluids in the form of liquids and gases in a mixed state enter the chamber 14 through the pipe 18, and from said chamber they pass upwardly through the nozzle 17. After dripping from the nozzle the gases, due to their buoyancy, separate from the fluids, and while the liquids accumulate in the stand-pipe the gases pass upwardly through the opening 15 into the chamber 13 and thence through the supply-pipe 19 to the main. The gas in the stand-pipe has of course a specific pressure, and this pressure is communicated to both sides of the piston-valve 26, so that the latter remains stationary and holds its extension 27 over the recess 29 and prevents egress of gases or liquids. As soon, however, as the liquid in the stand-pipe rises to a height sufficient to increase the hydrostatic pressure upon the face side of the piston-valve to a point above the resistance of the weight of the piston-valve, plus the friction in the casing and the elasticity of the rubber disk 25, the piston-valve will be raised and the extension 27 will be lifted from the recess 29, when the water from the stand-pipe will pass outwardly through passage 32 and passage 30 and will be drained off. There is always a certain quantity of liquid within the stand-pipe, and which water has a sufficient hydrostatic pressure to balance the piston-valve, or rather slightly less than that amount, whereby as soon as the liquid in the stand-pipe is drained sufficiently to reach this point, the drainage ceases, due to the closing of the recess 29, and begins again as soon as the liquid has reached the proper height. It will furthermore be seen that with this construction while the rubber disk 25 permits the operation of the piston-valve it precludes the access of the accumulated fluids to the working parts, and thus corrosion is absolutely prevented. Moreover, the quantity of liquid which stands at all times in the stand-pipe acts as a seal for the passage leading to the piston-valve casing, and thus the gases are kept from the rubber disk.

It will of course be seen that in practice the specific construction and arrangement shown and described may be varied and that various modifications may be made without departing from the spirit of my invention.

Having thus described my invention, what I claim is—

1. In a separator comprising a base having a stand-pipe mounted thereon, a cylindrical valve-casing mounted upon the base, a passage through the base connecting the stand-pipe with the valve-casing, a second passage through the base leading to the valve-casing, a diaphragm-clamp between the casing and base and carrying a valve adapted to normally close the second passage through the base, a cylindrical piston in the casing and having a lower resilient head attached to the diaphragm and valve, and a pipe connecting the casing above the piston with the stand-pipe.

2. A separator comprising a receiver, a cap for the receiver inclosing a separate gas-receiver, and a gas-outlet connected with the inlet-chamber, a gas-outlet connected with the outlet-chamber, a pipe leading from the inlet-chamber into the receiver below the cap, a drain-passage in the receiver, a valve for the drain-passage adapted to be opened by pressure from the receiver, and a cylindrical pipe leading from the valve to the outlet-chamber.

3. A separator comprising a receiver, a cap for the receiver inclosing a separate gas inlet chamber and gas-outlet chamber, a gas-inlet pipe connected with the inlet-chamber, a gas-outlet pipe connected with the outlet-chamber, a pipe leading from the outlet-chamber into the receiver below the cap, a drain-passage in the receiver, a valve adapted to close said passage, said valve being raised and lowered by the pressure within the receiver, and an equalizing means in communication with the valve and the outlet-chamber.

In testimony whereof I affix my signature in presence of two witnesses.

ALONZO J. SIMMONS.

Witnesses:

HERBERT E. TREADWELL,

Geo. C. SHOEMAKER.