H. H. M. KAMMERHOFF.

GAS FILTERING OR SEPARATING VALVE.

APPLICATION FILED FEB. 9, 1914.

1,190,654. Patented July 11, 1916.

Fig. 1.

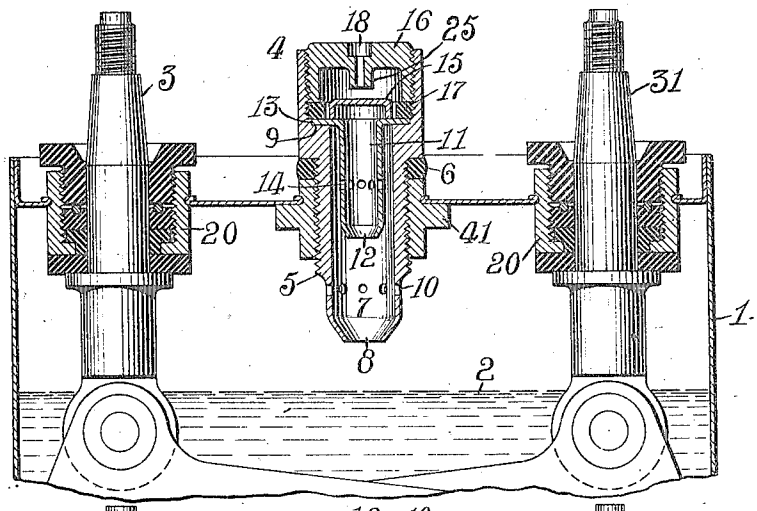
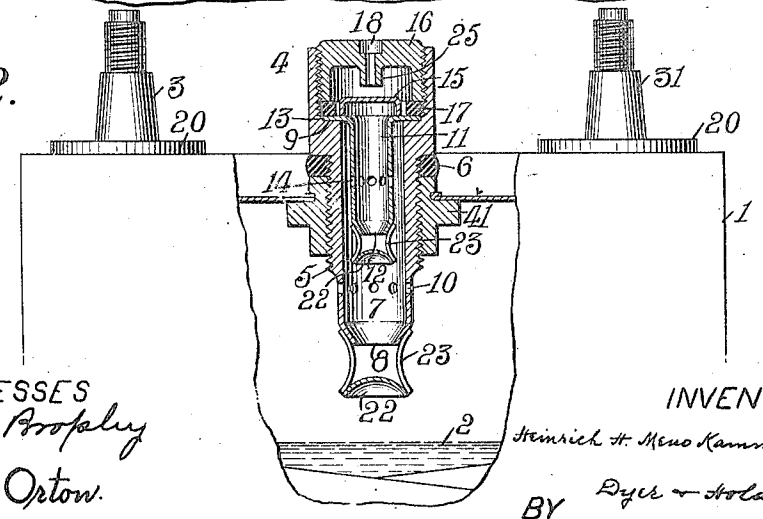


Fig. 2.



WITNESSES

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GAS FILTERING OR SEPARATING VALVE.

1,190,654. Specification of Letters Patent. Patented July 11, 1916.

Application filed February 9, 1914. Serial No. 817,494.

To all whom it may concern:

Be it known that I, HEINRICH H. MENO KAMMERHOFF, a subject of the Emperor of Germany, and a resident of Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Gas Filtering or Separating Valves, of which the following is a description.

My invention relates to gas filtering or separating valves particularly adapted for use in connection with galvanic cells or batteries, and in some aspects is an improvement upon an invention disclosed and broadly claimed in my application, Serial No. 817,493 filed February 9, 1914, and entitled Galvanic batteries.

One of the objects of my invention is to provide a simple and improved form of valve which will automatically and effectively strain or separate all liquids from the gases passing from the battery can or container, and which will return the strained liquids to the container without interfering with the egress of the escaping gases whereby the outside of the cell will remain dry.

Various other objects and features of my invention will be more fully set forth in the following description of the preferred embodiments of my invention. These embodiments of the invention each include a plurality of nested tubes, each of such tubes having a lower open end for the return of the liquid, and each having gas vents in the sides thereof for the escape of the gases in succession therethrough and past a puppet valve which controls the final movement of the filtered gases.

My invention also consists in certain details of construction and combination of parts hereinafter more fully set forth and claimed.

For a clearer understanding of my invention attention is directed to the accompanying drawing forming a part of this specification and in which;

Figure 1 is a transverse vertical sectional view through the upper portion of a storage battery cell showing a preferred form of my invention in position therein; and Fig. 2 is a view in front elevation, partly broken away, of the upper portion of a storage battery cell, showing in section, a slightly modified form of my invention applied thereto.

Referring to the drawing, reference character 1 represents a cell container or battery can having therein a suitable electrolyte 2 and battery elements having poles 3 and 31, which pass through suitable insulating stuffing boxes 20 in the top of the container, all as is usual with devices of this character. Threaded through the top of the container 1 and preferably through a reinforcing sleeve 41 fixed to the top of the container is the filtering valve 4 particularly forming the subject matter of my invention. This valve comprises a pair of nested tubes, the outer tube 5 of which is suitably threaded for engagement with the sleeve 41 and is preferably maintained in fluid tight engagement therewith by means of a gasket 6. The inner end of the bore 7 of this tube is preferably constricted to form a lower outlet opening 8 relatively small in cross sectional area compared with that of the main portion of the bore, and the opposite end portion of the bore is enlarged to form a shouldered seat 9. This tube has a plurality of vents 10 circumferentially arranged in the side thereof and positioned slightly above the lower outlet opening 8, thus placing the main portion of the bore in direct communication with the interior of the container 1. The inner and relatively short tube 11 is spaced from the sides of the bore 7, has a lower constricted outlet opening 12 positioned above the vents 10, and has an outstanding flange 13 removably seated upon the shoulder 9. This inner tube also has vents 14 circumferentially arranged in the side thereof to place the main portion of the bore of the inner tube in direct communication with the bore 7 of the outer tube. A puppet valve 15 normally closes communication through the upper end of the inner tube 11 and rests upon the flange 13, a portion of which constitutes the valve seat therefor. The enlarged end portion of the bore 7 is closed by means of a cap 16 threaded therein and which bears upon a gasket 17 which locks the flange 13 on its seat and provides means for limiting the lateral movement of the puppet valve 15. The cap 16 has a passageway 18 therethrough permitting the escape of the gases after they have passed the puppet valve. The cap 16 is preferably provided with an inwardly extending projection 25, arranged substan-

tially centrally thereof and through which the passageway 18 preferably extends; this projection 25 serving as means for limiting the unseating movement of puppet valve 15.

In the embodiment illustrated in Fig. 2, a baffle plate 22, preferably in the form of a segment of a sphere, is attached to the lower end of each of the tubes 5 and 11, in spaced relation thereto, by means of spaced arms 23, with the convex side of each plate 22 upwardly disposed. The baffle plate attached to tube 11 is preferably positioned above the openings 10 in the outer tube 5 so as to intercept any liquid which may splash through these openings.

In operation, the liquid-saturated gases within the container 1 pass through the vents 10 which act to separate the liquids from the gases, the liquids passing back into the container through the open end 8 of tube 5 while the partly filtered gases pass up through the bore 7 and through the vents 14. The obstruction of the outlet openings 8 and 12 by the liquids in returning to the body of electrolyte 2 tends to cause the gases to pass through the vents 10 and 14. The movement of the gases through the second set of vents again separates them from their contained liquids and this filtering operation may be continued as desired, it merely being necessary to install a sufficient number of nested tubes to insure a substantially thorough filtration or separation of all of the liquids from the gases before they are finally permitted to escape. The arrangement of the outlet openings 8 and 12 substantially in vertical alinement with each other, as shown, facilitates the return of the filtered liquid directly to the electrolyte 2. The puppet valve 15 normally maintains the interior of the container out of communication with the outside air, but this puppet valve may be made as light as desired so that but little internal pressure is necessary to move this valve into open position and thereby eliminate the possibility of the generation of an abnormal pressure within the container. In the embodiment illustrated in Fig. 2, the baffle plates 22 tend to prevent the splashing of any of the electrolyte into the bores of tubes 5 and 11 respectively, but permit the ready return of any liquid in these tubes to the body of electrolyte 2 in the container 1. Accordingly, it is preferable to employ the form shown in Fig. 2 in battery cells which will be subjected to shocks and jars, as in the case of cells used on vehicles.

It will be apparent from this disclosure that the different parts of my invention may be cheaply manufactured and readily assembled and taken apart for the repair and substitution of parts.

While I have described and shown the preferred embodiments of my invention, many changes may be made therein without departing from the spirit thereof, and I do not, therefore, wish to be limited to the specific structures shown and described.

Having now fully described my invention, what I claim as new and desire to protect by United States Letters Patent is as follows:

1. A valve comprising a valve tube, one end of the bore of which is constricted and the opposite end of which is enlarged to form a seat therein, an inner tube removably supported from said seat, a puppet valve normally closing the bore of said inner tube, and a cap having a vent therethrough, said cap being positioned in the enlarged portion of said first named bore, inclosing said puppet valve and maintaining said inner tube in position, each of said tubes having one or more gas vents in the sides thereof, substantially as described.

2. A valve comprising a plurality of nested tubes spaced from each other, the lower end of certain of said tubes having a constricted bore and each tube having one or more relatively small vents in the side thereof, the lower end of an inner tube being positioned above the side vent or vents in the next adjacent outer tube, and a puppet valve for controlling the passage of fluids through the innermost tube, substantially as described.

3. A valve comprising a plurality of nested tubes spaced from each other, the lower end of certain of said tubes having a constricted bore and each tube having one or more relatively small vents in the side thereof, the lower end of an inner tube being positioned above the side vent or vents in the next adjacent outer tube, a puppet valve for controlling the innermost tube, and means for limiting the unseating movement of said puppet valve, substantially as described.

4. A valve comprising a plurality of nested tubes spaced from each other, the lower end of certain of said tubes having a constricted bore and each tube having one or more relatively small vents in the side thereof, the lower end of an inner tube being positioned above the side vent or vents in the next adjacent outer tube, substantially as described.

5. A valve comprising a plurality of nested tubes spaced from each other, and each tube having one or more relatively small vents in the side thereof, the side vent or vents of an inner tube being positioned above the side vent or vents in the next adjacent outer tube, substantially as described.

6. A valve comprising a plurality of nested tubes spaced from each other, and each tube having one or more relatively small vents in the side thereof, the lower end of an inner tube being positioned above the side vent or vents in the next adjacent outer tube, and means for intercepting the flow

through the innermost tube until a predetermined internal pressure has been reached, substantially as described.

7. A valve comprising a plurality of nested tubular members spaced from each other and having open lower ends, each member having means for directing fluids through the sides thereof in succession, substantially as described.

8. A valve comprising a plurality of nested tubes spaced from each other, and each tube having one or more relatively small vents in the side thereof, the side vent or vents of an inner tube being positioned above the side vent or vents in the next adjacent outer tube, one of said tubes having a lower open end, and means for preventing the splashing of liquid into said open end, substantially as described.

9. A valve comprising a plurality of nested tubes spaced from each other and having lower open ends, each tube having one or more vents in the side thereof, the lower end of an inner tube being positioned above the lower end of the next adjacent outer tube, and means for preventing the splashing of liquid into the open lower end of one of said tubes, substantially as described.

10. A valve comprising a plurality of nested tubes spaced from each other and having lower open ends, the lower end of an inner tube being positioned above the lower end of the next adjacent outer tube, and a baffle member carried by each tube spaced from and disposed across its lower open end, substantially as described.

11. A valve comprising a plurality of nested tubes spaced from each other and having lower open ends, and each tube having one or more relatively small vents in the side thereof, and a baffle member carried by each tube spaced from and disposed across its lower open end, the lower end and baffle member of an inner tube being positioned above the side vent or vents in the next adjacent outer tube, substantially as described.

12. In a galvanic cell, the combination with a container adapted to receive an electrolyte, of a vent therefor comprising a plurality of nested tubes spaced from each other and extending into said container through the top thereof, each of said tubes having a lower open end and one or more vents in the side thereof the lower end of an inner tube being positioned above the lower end of the next adjacent outer tube, and means positioned between said electrolyte level and the lower open end of the outermost tube for preventing the splashing of the electrolyte into said outermost tube, substantially as described.

13. A valve comprising a plurality of nested tubes spaced from each other, one of said tubes having a lower open end, and each tube having one or more relatively small vents in the side thereof, substantially as described.

14. A valve comprising a plurality of nested tubes spaced from each other and having open lower ends, and means supported below and in spaced relation to the open lower end of one of said tubes for preventing the splashing of liquid into the latter, substantially as described.

15. A valve comprising a plurality of nested tubes spaced from each other and having open ends, each tube having one or more vents in the side thereof, and means for preventing the splashing of liquid into the open lower end of one of said tubes, substantially as described.

This specification signed and witnessed this 6th day of February 1914.

HEINRICH H. MENO KAMMERHOFF.

Witnesses:
WILLIAM A. HARDY,
MARY J. LAIDLAW.