Nov. 27, 1928. 1,693,468

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SEALING PISTON FOR RESERVOIRS FOR THE STORAGE OF GAS, STEAM, OR EASILY EVAPORATING LIQUIDS

Filed Jan. 5, 1927

Fig. 1.

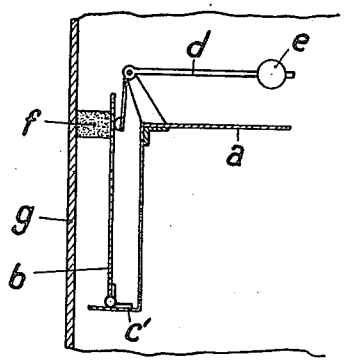


Fig. 3.

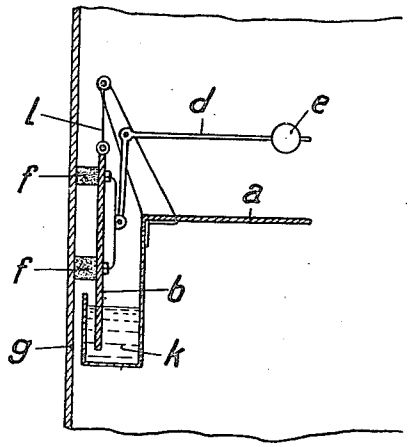
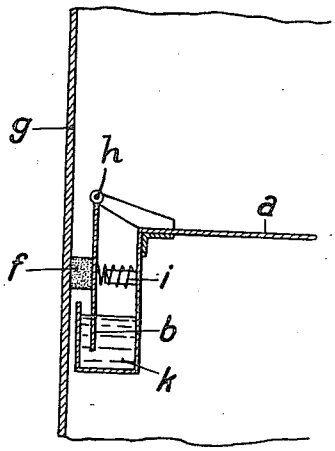


Fig. 2.



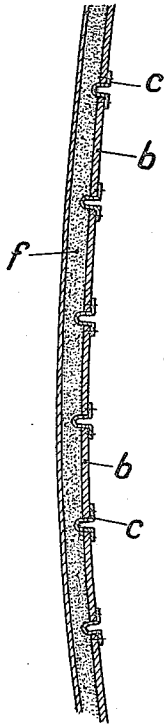


Fig. 4.

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Patented Nov. 27, 1928. 1,693,468

UNITED STATES PATENT OFFICE.

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SEALING PISTON FOR RESERVOIRS FOR THE STORAGE OF GAS, STEAM, OR EASILY-EVAPORATING LIQUIDS.

Application filed January 5, 1927, Serial No. 159,230, and in Germany January 6, 1926.

The invention relates to improvements in sealing-pistons for reservoirs for the storage of gas, steam, or easily evaporating liquids, in which a packing-ring, surrounding the piston, is forced against the wall of the reservoir. In the known arrangements of this kind, force is exerted upon the packing-ring by single levers, or by single angle-segments, separated from one another.

According to the present invention, the packing-ring is supported by an endless, flexible sheet-metal ring, upon which the elements, (weight, springs) act in forcing the packing-ring against the wall of the reservoir.

The advantage of this arrangement consists therein, that a perfectly uniform action is obtained upon the packing-ring, so that a sealing-piston is produced, which may in fact be used in practice without the employment of a fluid-packing.

Examples of executing the invention, are illustrated in the drawing, in which

Figs. 1, 2 and 3 are vertical, axial sections of the piston in different types of construction,

Fig. 4 is a horizontal section pertaining thereto, of the devices for exerting force upon the plates are omitted.

In the construction illustrated in Fig. 1, the piston *a* is on its outer circumference provided with a ring consisting of single plates *b*. The plates *b* are by their lower ends rigidly fastened to the piston by angle-irons *c'* and connected by means of elastic caps *c* (Fig. 4), so that a continuous, elastic sheet-metal ring is formed. The plates *b* are forced radially outwards by angle-levers *d* loaded with weights *e*.

In order to distribute the pressure of the angle-levers uniformly over the entire plate, the said plate is preferably provided with a profiled iron, (not illustrated) running-out in the direction of the periphery, upon which the angle-lever exerts its action.

The plates *b* carry on their upper end an endless packing-ring *f*, which is forced against the inner walls *g* of the reservoir. The said ring may be made of a cotton texture inlaid with rubber, cotton with leather insertions, asbestos with rubber, rubber only, leather only, or similar materials being flexible and gas-tight.

In the construction illustrated in Fig. 2, the plates of the sheet-metal-ring, connected by caps *c*, are flexibly suspended at their upper ends at *h*, but they need not be flexible in this case in themselves. The plates are forced outwards by springs *i*. As the lower end of the plates *b* is not rigidly connected with the piston *a*, packing has to be provided between the said plates *b* and the body of the piston.

In the present instance, a plunger-lock *k* has been provided, packing may however be arranged in any other suitable manner.

In the arrangement according to Figs. 3 and 4, the plates *b* of the sheet-metal ring connected by caps *c*, are suspended on the piston *a* by means of rods *l* and forced outwards by weights *e*, by means of angle-levers *d*, as in the type of construction illustrated in Fig. 1. The plates carry two packing-rings *f*.

The instrumentalities constructed and arranged as herein specified provide a two-fold sealing unit positively preventing gas escape between the piston and holder, i. e., a liquid seal structure or "liquid trap", in a lower horizontal plane and a mechanical seal structure in the nature of an expansible and compressible packing ring, adapted for lubrication if desired, in superposed relation to the liquid seal structure, the characteristic of the combined seal being that the packing carrying member constituting the liquid seal is subjected to a constant dilating pressure, establishing a fluid tight joint between the packing and holder.

I claim:—

1. In a sealing-piston for reservoirs for the storage of gas, steam or easily evaporating liquids a packing ring, a closed flexible and dilatable sheet-metal ring the parts of which are tightly connected to one another, said sheet metal ring supporting said packing ring and means for pressing said packing ring against the walls of the reservoir.

2. In a sealing-piston for reservoirs for the storage of gas, steam or easily evaporating liquids a packing ring, an endless flexible and dilatable sheet-metal ring supporting said packing ring, said sheet-metal ring consisting of plates connected by means of elastic caps, and means for pressing said packing ring against the walls of the reservoir.

3. In a sealing-piston for reservoirs for the storage of gas, steam or easily evaporating

liquids a packing ring, an endless flexible and dilatable sheet-metal ring supporting said packing ring, one edge of said metal ring being linked to the piston, and means for pressing said packing ring against the walls of the reservoir.

4. In a sealing-piston for reservoirs for the storage of gas, steam or easily evaporating liquids a packing ring, an endless flexible and dilatable sheet-metal ring supporting said packing ring, said sheet-metal ring consisting of plates connected by means of elastic caps, one edge of said metal ring being linked to the piston, and means for pressing said packing ring against the walls of the reservoir.

5. In a sealing-piston for reservoirs for the storage of gas, steam or easily evaporating liquids a packing ring, an endless flexible and dilatable sheet-metal ring supporting said packing ring, the upper edge of said metal ring being linked to the piston, a cup provided on the piston, the lower edge of said metal ring being plunged into said cup, and means for pressing said packing ring against the wall of the reservoir.

6. In a sealing-piston for reservoirs for the storage of gas, steam or easily evaporating liquids a packing ring, a closed flexible and dilatable sheet-metal ring, said sheet metal ring consisting of plates connected by means of elastic caps supporting said packing ring, angle levers with adjustable weights, being arranged on the upper side of the piston, said levers forcing radially outwards said plates and pressing said packing ring against the wall of the reservoir.

7. In a device of the class described, in combination with a gas holder and piston, a two-fold sealing unit mounted on the piston, comprising a liquid seal structure and a packing member disposed in parallel planes, the liquid seal structure comprising a dilatable member flexibly connected to the piston, said packing carried thereby and means providing a yielding contact between said packing and holder.

8. In a device of the class described, in combination with a fluid holder and floating piston formed with an annular liquid seal cup member adjacent the holder, a flexible and dilatable liquid seal constituting member secured to move with and in relation to the piston, a packing carried thereby and tension means holding the packing in yielding contact with the holder.

9. In a device of the class described, in combination with a fluid holder and floating piston formed with an annular liquid seal cup member adjacent the holder, a flexible and dilatable liquid seal constituting member secured to move with and in relation to the piston, a packing carried thereby and tension means tending to dilate said member and yieldingly contact the packing against the holder.

In testimony whereof I have affixed my signature.

FRIEDRICH SCHÜRMANN.