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L. P. STOREY

EXPANSION CHAMBER FOR PUMPS

Filed April 24, 1926

Fig. 1

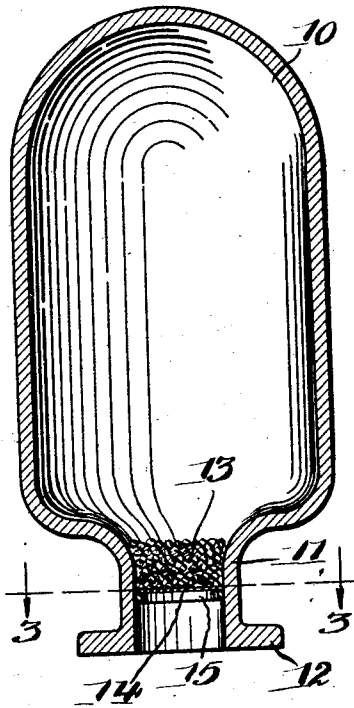


Fig. 2

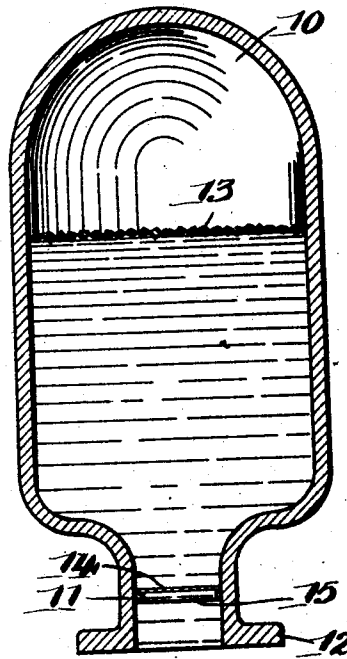
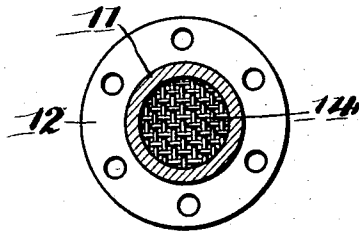


Fig. 3

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EXPANSION CHAMBER FOR PUMPS.

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My invention relates to improvements in air chambers of the class commonly used on pumps and fire engines to compensate for fluctuations and sudden cessation of flow of liquid therethrough. These air chambers are commonly placed in communication with the delivery hose or pipe on the pressure side of the pump connections to form a pneumatic cushion against variations in pressure or flow of the liquid delivered by the pump.

The efficiency of devices of this class is dependent upon the presence in the chamber of a considerable volume of air under pressure, and in the operation of air chambers heretofore used, there is a substantial decrease of this volume due to leakage through the walls of the chamber and absorption of the air by the liquid with which it is in contact. The former cause of loss has been controlled to a considerable extent by the use of dense and relatively impervious metal to form the walls of the chamber. The larger factor of loss is due to the absorption of the air by the water or other liquid which compresses it in the chamber.

The object of my invention is to minimize this loss, and I have found that by the use of the simple means hereinafter described and claimed, the periods of use of the air normally present in the chamber are greatly increased and also that a much smaller chamber than those heretofore used becomes efficient.

In the accompanying drawings forming a part of this specification, Figure 1 is a central, vertical section of a common form of air chamber with my improvements attached; Fig. 2 is a similar central, vertical section of the chamber with the liquid in normal or operating position and Fig. 3 is a horizontal cross section taken on the line 3-3 of Fig. 1.

In the accompanying drawings, the reference numeral 10 indicates an air chamber of ordinary construction with its neck 11 and the flange 12, by which it is connected in the usual way with a pump or other device (not shown) for the transmission of liquid under pressure. I supply the air chamber 10 with a quantity of loose comminuted, fragmentary or broken material of low specific gravity, such as cork 13 and confine such material in the chamber by means of a screen 14, held in a frame 15, which is fastened in the neck 11

of the chamber by soldering or other suitable means. When there is no fluid other than the air in the chamber, this comminuted, fragmentary cork or similar material occupies the position shown in Fig. 1, and when the pump is in operation, and water or other liquid enters the chamber, the cork floats upon the surface thereof (see Fig. 2) forming a yielding and flexible blanket between the compressed air and the liquid upon which this blanket floats. It will thus be seen that contact between the liquid and air is prevented, except at the small interstices between the floating pieces of cork, and since absorption is proportionate to the area of contact between the air and liquid, there is no pronounced tendency of the air to pass through the blanket and be absorbed by the water. I have found by actual test that in a given chamber containing a certain quantity of air and liquid, under operating conditions, the air remains unabsorbed for a period in excess of three times as long when my device is used as in the same chamber under like conditions without the use of my device.

The use of my improvement permits reduction in size and weight and a more compact form of air chamber, and thereby reduces cost of production as well as the area of air in contact with the walls of the chamber. It also eliminates the necessity of auxiliary means for replenishing the air and effectively minimizes fluctuations in pressure in the delivery conduit and frequency of shut downs. The cork possesses great inherent elasticity and functions as an auxiliary to the air and prevents the intermingling of the air and water by reducing the wave effect upon the surface of the liquid.

In this specification and the following claims, I have used the word "cork" to indicate the material of which my floating blanket is formed, because cork is the best material for that use at present known to me, but it is obvious that other impervious material of light specific gravity may be used for that purpose and is within the spirit and intent of this specification and the following claims. The essential characteristics of the material used for the blanket are that it shall be of low specific gravity and relatively non-absorbent and preferably resilient.

I have used the words "comminuted" and "fragmentary" to indicate the condition of

such cork or other material, but it is evident that the degree to which the pieces or particles of the cork shall be subdivided is a matter of choice and the fineness or coarseness of the individual pieces of the material is not intended to be limited by the use of the terms comminuted or fragmentary.

Having described my invention what I claim as new and desire to protect by Letters Patent is:

1. The combination with an air chamber for pumps or the like, of a quantity of comminuted cork or similar material forming a floating blanket between a column of liquid and the air in said chamber to retard the absorption of the air by the water therein.

2. In an air chamber, a quantity of fragmentary material of low specific gravity and a pervious support for said material fixed in

the air chamber and adapted to confine said material to the chamber.

3. In an air chamber, a screen at the base thereof and a quantity of comminuted cork or the like adapted to rest on said screen when the chamber is empty and to float upon and cover the surface of liquid entering the chamber.

4. The combination with an air chamber for pumps and the like of a quantity of loose fragments of low specific gravity and of impervious nature, floating upon the liquid in said chamber and of a quantity proportioned to the area of the surface covered, whereby the absorption of the air in said chamber by the water therein is retarded.

In testimony whereof, I have hereunto signed my name to this specification.

LEONIDAS P. STOREY.