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[54] **TANK PRECHARGE PRESSURE CHECK VALVE**
1 Claim, 4 Drawing Figs.

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[56]

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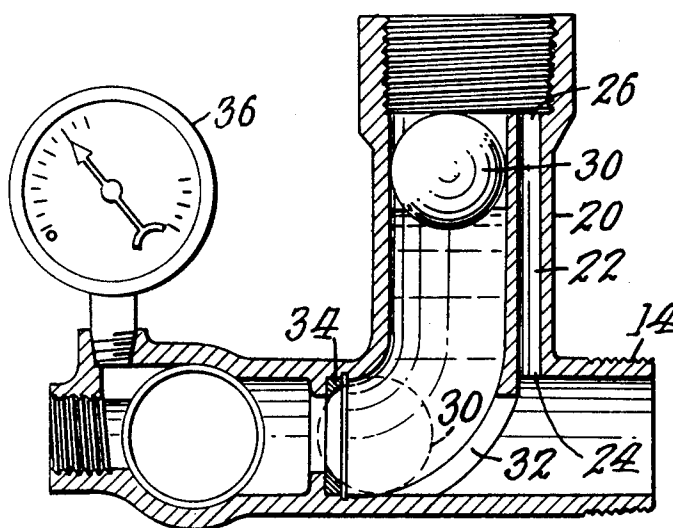
UNITED STATES PATENTS

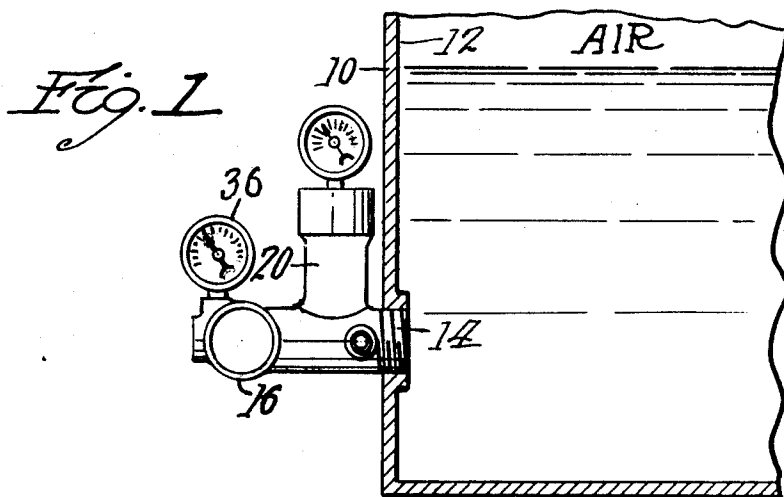
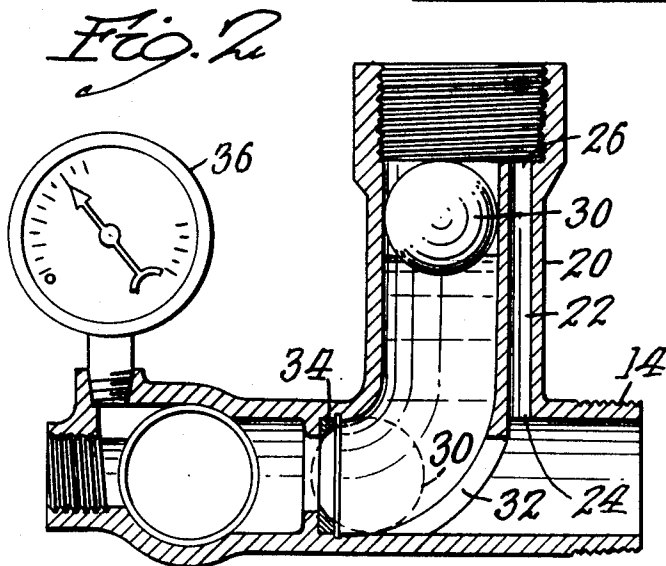
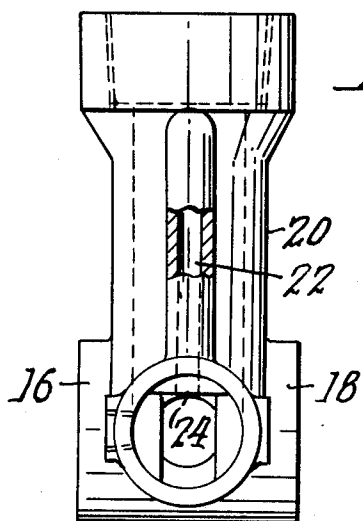
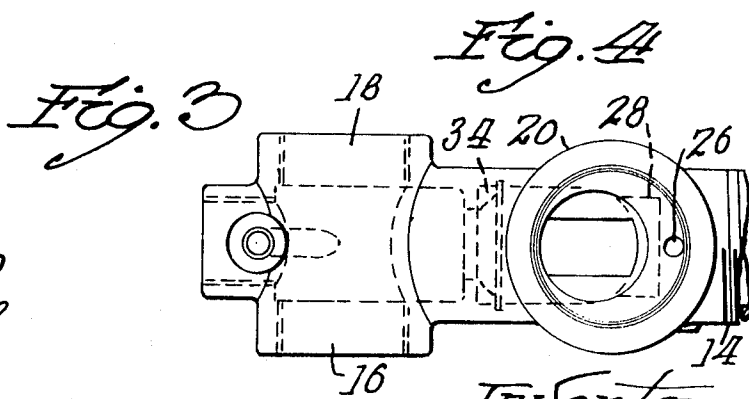
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ABSTRACT: A check valve including a vertical column which is applied to the outlet of a pressure tank, a ball in the vertical column, and a separate smaller pipe e.g. a Venturi tube, which leads from the tank to the top of the column.





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TANK PRECHARGE PRESSURE CHECK VALVE

BACKGROUND OF THE INVENTION

In tanks containing fluid under pressure, there has always been a problem involved in preventing the air pressure from escaping when the water level goes down to the outlet of the tank for instance because of failure of the pump to keep the tank pressure normal.

SUMMARY OF THE INVENTION

In the present case a check valve associated with an outlet is applied to a fluid tank below the normal fluid line. This valve is provided with a vertical column containing fluid under normal conditions with a ball floating therein, and a Venturi tube is located between the top of the vertical column and the interior of the tank, so that when the water level drops to uncover the Venturi tube, the air pressure in the tank passes through the tube into the column at the top thereof, forcing the ball down into a position against a check valve seat, stopping flow from the tank and preventing any further drop of the fluid level and therefore of the pressure in the tank.

When the pump again starts to fill the tank, the ball is thereby floated out of its checking position allowing water to flow past as before. This flow sucks air down through the vertical column through the Venturi tube allowing the ball and the water to rise in the column. Guideways are provided to maintain the ball in the desired path between the column and the check valve seat.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a view in elevation illustrating the location of the new fixture or check valve;

FIG. 2 is a view in section on a larger scale illustrating the construction and operation of the device;

FIG. 3 is a view in elevation looking in the direction of arrow 3 in FIG. 2, and

FIG. 4 is a plan view.

PREFERRED EMBODIMENT OF THE INVENTION

Referring now to FIG. 1, there is shown a conventional fluid tank 10. The normal fluid level is shown and above the same in the chamber at 12 is air which provides pressure on the fluid. A pump keeps the tank at this pressure regardless of the demand, and a shutoff or check valve or the like is usually mounted in the outgoing line, as well known.

The fixture shown in FIGS. 2 to 4 is provided with a threaded connection 14 for securement with respect to the wall of the tank 10; and a double connection for the pump and service at 16 and 18 in communication with the tank and a vertical column 20, the column 20 being open with respect to the interior of the body of the device. A Venturi tube 22 has an inlet at 24 at connection 14 and it leads to the top of the vertical column 20 as at 26. A lip at 28 enhances the Venturi effect.

This column will normally be filled with fluid approximately

for instance as shown or higher and a ball 30 floats in this area. The ball has a normal position as shown in solid lines and an operative shutoff position as shown in dotted lines in FIG. 2. There is also provided a curved guideway 32 which directs the ball between its floating position in solid lines and its check position in dotted lines, against a seat 34 particularly arranged for this purpose in the fixture.

In the operation of the device the ball will normally be in the solid line position in FIG. 2 and the fixture will be full of fluid which passes through the same upon demand. However if the pump should fail, the air pressure at 12 will continue to force fluid out of the tank 10 in response to demand and in the prior art when the level reaches the level of the fitting at 14 the air pressure will be lost and has to be replaced upon resumption of operation.

However in the present case the air pressure in the tank will travel through the Venturi tube 22 to the top of the vertical column and will press the ball down to a position where it shuts off the flow as shown in dotted lines against seat 34, and thus the air pressure will be maintained so that when the pump once more starts up, it is not necessary to replenish the air pressure in the tank and the device will operate in a normal manner.

When the pump again starts to fill the tank, the flow is into the tank 10. This flow sucks air down through the Venturi tube from the vertical column allowing the ball and the water to rise in the column to original position. The ball is guided along the curved guideway 32 which is provided with space to allow fluids to pass through.

Various gauges as at 36, clean out plugged holes etc. are available in the fixture, and it is to be noted that all the parts except the ball can be found unitarily in a single piece, preferably a casting.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. A tank precharge check valve comprising a fixture attached to and having direct access to a tank normally maintained at a predetermined pressure by means of a pump, a column on said fixture open with respect thereto so that liquid is located in the column, a check valve member floating in said column on said liquid, a check valve seat in said fixture opposite the connection thereof to the tank, and a venturi tube extending from the tank to the upper portion of said vertical column, whereby under normal conditions the check valve member normally floats in the column, but upon substantial depletion of liquid in the tank, air will pass through the venturi tube into the column, forcing the check valve member down against said check valve seat, closing the demand line and the air against escaping, wherein said venturi tube is constructed and arranged to provide for sucking air from the top of the vertical column when liquid is supplied to the tank, allowing the check valve member and the liquid to rise into the column upon restoration of normal operation.