

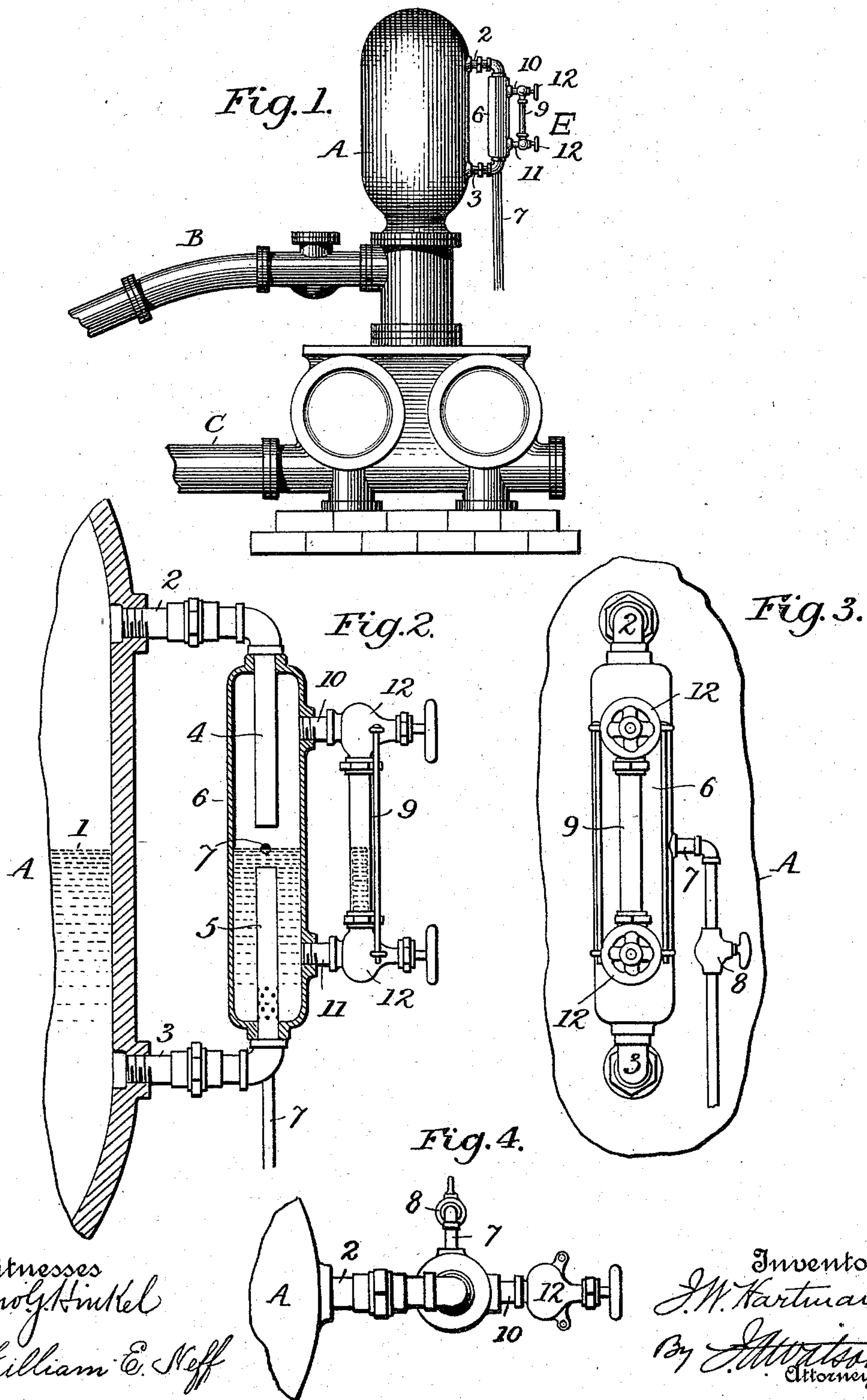
(No Model.)

J. W. HARTMAN.

DEVICE FOR PREVENTING ACCUMULATION OF AIR IN PRESSURE PIPES.

No. 571,364.

Patented Nov. 17, 1896.



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JOHN W. HARTMAN, OF BETHLEHEM, PENNSYLVANIA.

DEVICE FOR PREVENTING ACCUMULATION OF AIR IN PRESSURE-PIPES.

SPECIFICATION forming part of Letters Patent No. 571,364, dated November 17, 1896.

Application filed November 29, 1895. Serial No. 570,551. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. HARTMAN, a citizen of the United States, residing at Bethlehem, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Devices for Preventing the Accumulation of Air in Pressure-Pipes, of which the following is a specification.

The objects of this invention are to prevent the accumulation of air or gas in the pressure-pipes of pumps and to automatically regulate and render uniform the cushioning action of the air-chamber in force-pumps. In pumping water which is more or less charged with air or gas the air accumulates in the pipes and creates an injurious jarring or knocking, and it sometimes accumulates to such an extent as to impede the flow of water.

The accumulation of air in pressure-pipes tends also to render the flow of water irregular, and in limestone regions if the air and gas are not trapped off the water sometimes becomes milky and unfit for use from the formation of carbonate of lime in it. Furthermore, the amount of air in air-chambers often varies, and thus affects the regularity and smoothness of the operation of the pump.

The present invention consists in a device for trapping off the excess of air or gas in the water and for maintaining the air in the air-chamber connected with the pressure-pipe at a substantially uniform quantity.

In the following detailed description reference will be had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an end view of a pump, showing my invention applied to the air-chamber. Fig. 2 is an enlarged side view of the device, partly in section. Fig. 3 is a front view, and Fig. 4 is a plan view.

In the drawings, A indicates the air-chamber and B the pressure-pipe of a force-pump, the suction-pipe being indicated by C.

My invention is in general indicated by the letter E, and is shown attached to the side of the air-chamber.

It may be here stated that the invention is applicable to air-chambers upon the pressure-pipe, as well as an air-chamber directly upon the pump-frame, as shown in Fig. 1.

Referring to Figs. 2, 3, and 4, 1 indicates a normal water-line, which it is desired to maintain as nearly as possible in the air-chamber. This line of course will fluctuate considerably with the varying pressure in the main due to irregular action of the pistons. At some distance above and below the water-line a pair of pipes 2 3 are tapped into the air-chamber, and vertical portions 4 5, respectively, of these pipes extend toward each other and almost to the water-line, these vertical portions being inclosed in a small elongated chamber 6. Leading from the chamber 6 at the water-line is a small vent-pipe 7, provided with a valve 8. A gage-glass 9 communicates with the vent-chamber 6 through branches 10 and 11 at equal distances above and below the water-line, these branches being controlled by valves 12.

While the pump is in operation the valve 8 is kept open. The opening in the vent 7 is quite small and only a small portion of water can escape at times when there is not enough air to keep the water-line below the vent. The pipe 3 is sufficiently small to throttle to a certain extent the water passing through it, so that the water in the chamber 6 will not be so violently disturbed as to its level as the water in the air-chamber A is during the operation of the pump. Furthermore, the water in the vent-chamber 6 cannot rise above the lower end of pipe 4, excepting that a small portion of it may pass into said pipe. Nor can it fall to any appreciable degree below the upper end of pipe 5. The fluctuation in the vent-chamber is therefore controlled by bringing the ends of the inlet-pipes nearly to the vent. The air in the water as it passes the air-chamber will rise to the top, and as it accumulates it will force the water-level below the vent and escape. The amount of air will be maintained practically uniform, thus securing uniformity in the cushioning action and preventing the pump from being strained by an excess or deficiency of air. The water in the gage-glass will indicate the water-level at all times and serve to show whether the apparatus is working properly or not.

I have found that although the water-level may fluctuate considerably in the air-chamber at each stroke of the pump there is a very

little fluctuation in the vent-chamber, the water therein remaining at a practically uniform level. This is due to the fact that the water is throttled in the pipe 3, and, further, 5 to the rapidity with which the pressure changes in the main chamber, the periods of high and low pressure in the air-chamber being so brief that the water in the vent-chamber does not have time to ebb and flow to any 10 great extent.

The lower portion of the vent-chamber serves as a settling-chamber for any dirt which may pass in through the pipe 3 to said chamber. This aids in preventing the vent- 15 hole, which is very small, from becoming choked.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

20 1. The combination with a pump and its pressure-pipe, of an air-chamber in communication with the pressure-pipe, a vent-chamber 6 having a small vent midway of its height, a pipe leading from the air-space of the air- 25 chamber into the upper portion of the vent-chamber, and a pipe leading from the water-space of the air-chamber into the lower portion of the vent-chamber, substantially as described.

30 2. The combination with a pump and its

pressure-pipe, of an air-chamber in communication with the pressure-pipe, a relatively small vent-chamber having a small vent-pipe leading from its middle portion and provided with a valve, a pipe leading from the air- 35 space of the air-chamber into the upper end of the vent-chamber and extending down nearly to the vent, and a pipe leading from the water-space of the air-chamber into the lower end of the vent-chamber and extend- 40 ing upward nearly to the vent, substantially as described.

3. The combination with a pump and its pressure-pipe, of an air-chamber communicating with the pressure-pipe, a relatively 45 small vent-chamber having a small normally open vent at its middle portion, pipes connecting the upper and lower portions of the vent-chamber respectively with the air-space and the water-space of the air-chamber, and 50 a gage-glass communicating respectively with the upper and lower portions of the vent-chamber, substantially as described.

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

JOHN W. HARTMAN.

Witnesses:

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