United States Patent [19]

Hughes

[11] **3,858,014**

[45] **Dec. 31, 1974**

[54] **GAUGE AND SWITCH DIAPHRAGM PROTECTOR**

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[52] **U.S. Cl.**..... **200/83 R,** 200/61.2 S, 200/302, 210/90

[51] **Int. Cl.** **H01h 35/34**

[58] **Field of Search** ..... 200/81 R, 81.9 R, 83 R, 200/83 V, 153 T, 61.2, 61.21, 61.25, 302, 304; 210/90, 446; 417/36, 38

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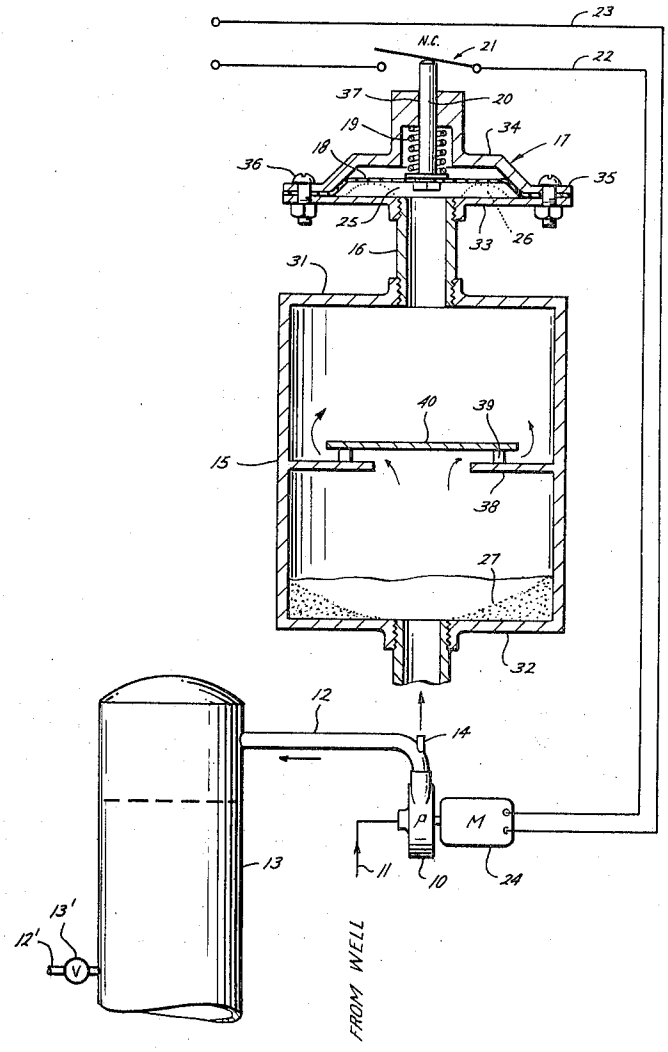
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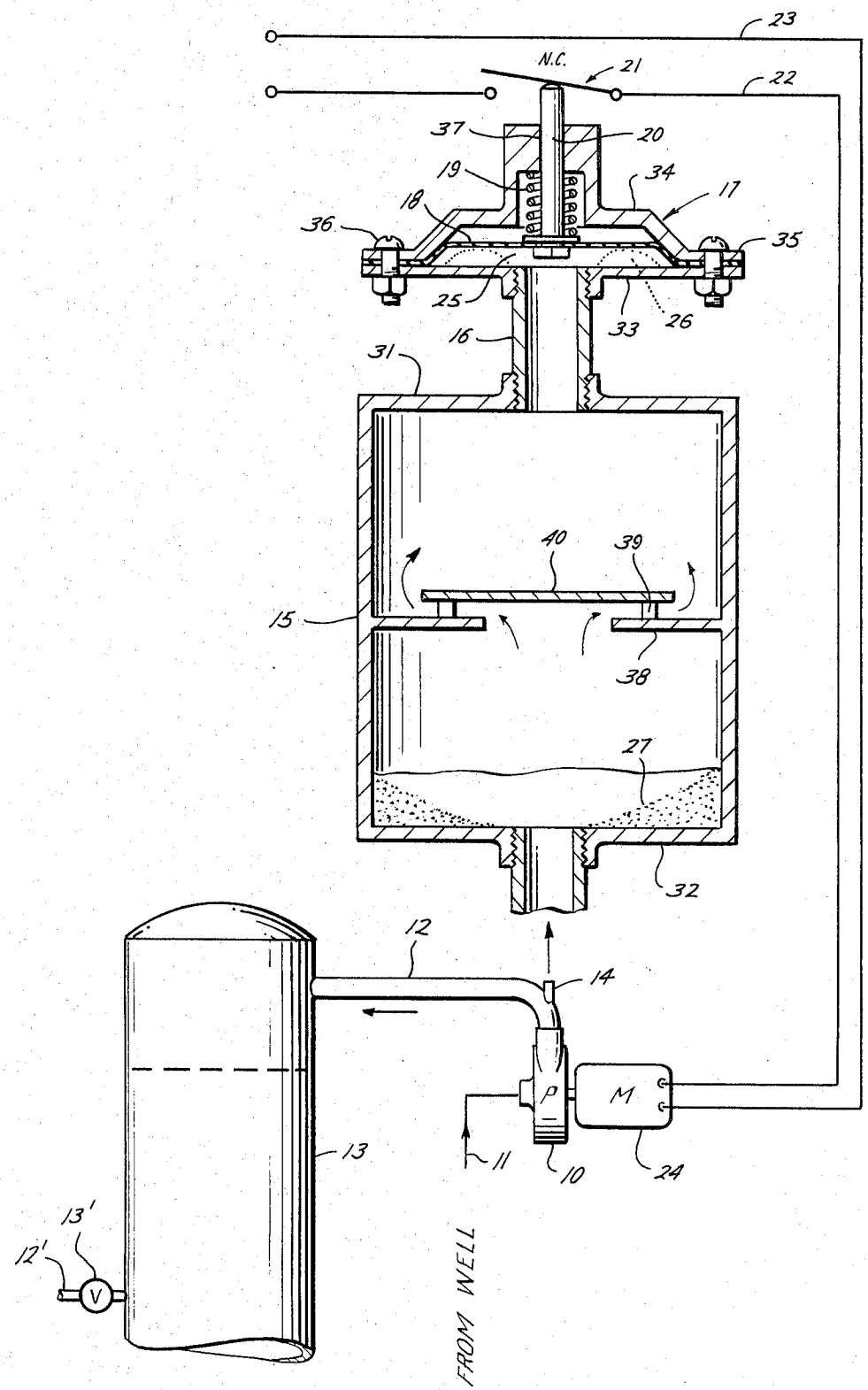
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[57] **ABSTRACT**

A gauge and switch diaphragm protector comprising an expansion chamber mountable in a fluid conduit between the pressure source and pump switch, having sand diverting baffles mounted therein, adapted to divert sand in the fluid to the outer wall of the chamber without diminishing the pressure of the fluid.

4 Claims, 1 Drawing Figure




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GAUGE AND SWITCH DIAPHRAGM PROTECTOR

BACKGROUND OF THE INVENTION

This invention is an improvement over the invention of applicant upon which U.S. Pat. No. 3,114,320 has been issued.

SUMMARY OF THE INVENTION

A gauge and switch diaphragm protector having an expansion chamber mountable in the flow line between the pressure tank and switch, in which baffles are mounted to deflect the sand in the fluid to the outer wall of the expansion chamber.

BRIEF DESCRIPTION OF THE DRAWINGS

The FIGURE is an elevational view, showing the expansion chamber in cross section.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings, the numeral **10** designates a pump, such as may be commonly found on domestic water wells, as **11**, which is provided with a flow line **12** from the pump to the pressure tank **13**, which has the outlet line **12'** and control valve **13'**. A lateral conduit as **14** provides connection to the expansion chamber **15** from the pressure line **12**. An outlet **16**, at the other end of the expansion chamber **15**, provides a connection with the pump switch **17**, in which the diaphragm **18** is mounted. A spring **19** maintains constant pressure on the diaphragm **18**, urging the switch **21** into closed position through the stem **20**, which is connected at one end to the diaphragm and the other end bears against the switch **21**. Current flows through the lines **22, 23** to the motor **24** when the switch **21** is closed. Without the expansion chamber **15**, sand, such as **26**, will build up in the area **25** beneath the diaphraghm and will prevent the diaphragm from returning to its closed position and will hold the pump switch open, preventing the pump from being activated and the pressure tank from being refilled. As the fluid flows from the well to the pressure tank, it will similarly flow through the line **14** to the expansion chamber **15**, and as the fluid expands in the chamber **15**, sand, as **27**, will be deposited on the bottom of the chamber and after the pump has stopped and pressure drops in the tank, the flow of fluid back through the line **14** will carry this sand back into the well.

The diaphragm **18** is of a flexible material and is bolted in the switch housing by means of the bolts **35, 36** which extend through the lower member **33** and the upper member **34**, and a passageway **37** for the stem **20**, extends through the upper member **34**.

Mounted in the chamber **15** is the baffle **38**, preferably midway between the bottom wall **32** and upper wall **31**, said baffle consisting of a disc-like member **38** mounted at its outer periphery to the inside wall of the chamber **15**, and having an axial passageway therethrough. The upper disc **40**, of lesser diameter than the said disc **38**, is mounted on the disc **38** by means of the legs **39, 39** which space the discs apart.

When the pump is in operation, the switch is in closed position. The pressure from the tank **13** gradually building up after the pump starts pumping, and when the predetermined pressure is reached in the tank **13**, and chamber **15**, the spring **19** will be overcome and the switch opened, and the motor operating the pump will stop. As fluid flows into the expansion chamber, it will expand, moving the sand therein to the outside of the chamber, and as the fluid strikes the baffles **38, 40**, any remaining sand will be diverted outwardly to settle on the bottom of the tank, through gravity, preventing a building up of a supply of sand under the diaphragm **18**.

It is obvious that any perforated disc may be employed as a baffle, or that more than one may be employed, within the expansion chamber, if desired.

While the attached drawings illustrate a diaphragm switch for a pump motor, it is contemplated that the same situation exists in many other types of gauges and that the herein described device may be applied to such gauges to prevent malfunction due to a collection of sand under the diaphragm, or other pressure operable member.

What I claim is:

1. In a means for diverting sand in a fluid conduit to prevent an accumulation beneath the diaphragm of an electrical switch in connection therewith, a diaphragm operated switch mechanism, a pressure line leading from a source of pressure to said mechanism for the conduct of fluid containing sand, an expansion chamber in said line between said source of pressure and said diaphragm operated mechanism, baffle means in said chamber across the flow line of fluid therethrough diverting sand in said fluid to the outside walls of said chamber.

2. The device defined in claim **1** wherein said baffles are disc-like members mounted in the expansion chamber.

3. The device defined in claim **1** wherein said baffles are spaced discs, one of said discs being of greater diameter than the other, and said disc of greater diameter being mounted on the inside wall of said chamber and the lesser diameter disc being spaced from the other disc and mounted thereon.

4. The device defined in claim **1** wherein said baffles are spaced discs having fluid passageways therebetween.

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