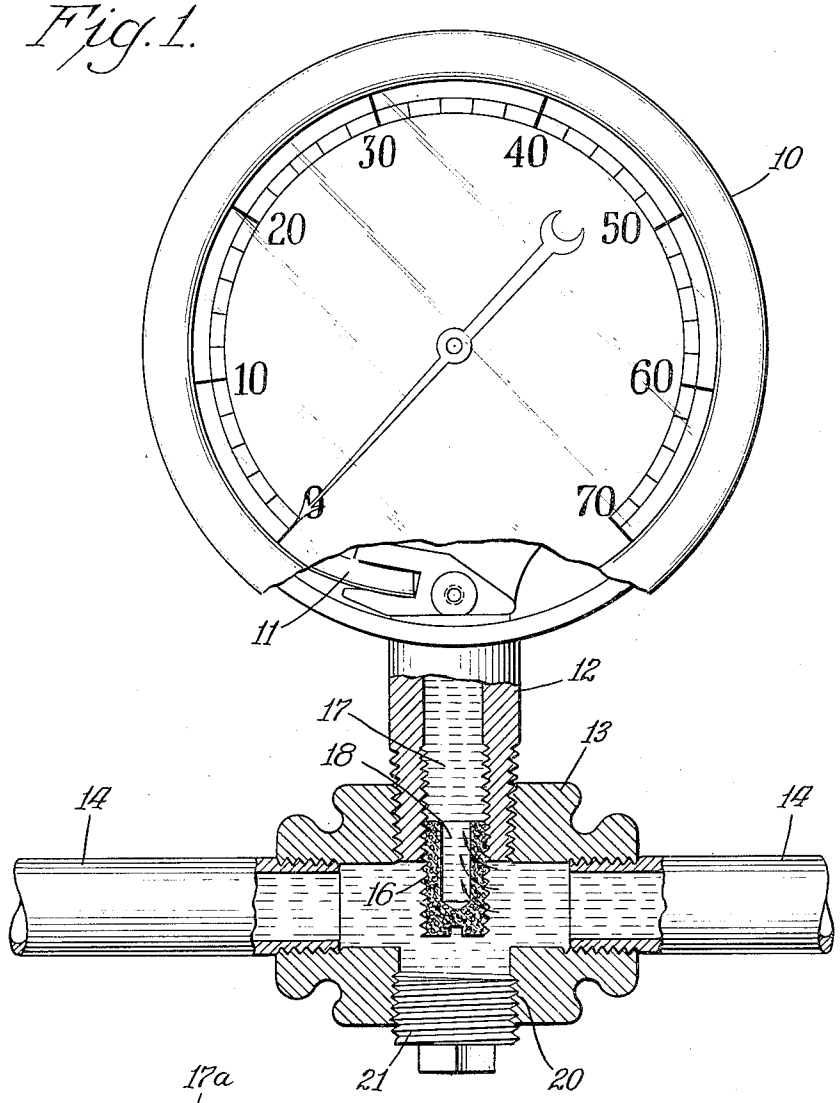
July 18, 1950 A. CLARKSON 2,515,394

PRESSURE GAUGE STABILIZER

Filed Feb. 28, 1946

Fig. 1.



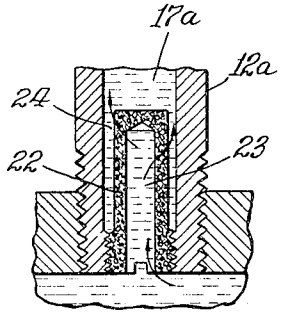


Fig. 2.

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PRESSURE GAUGE STABILIZER

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2 Claims. (Cl. 138—26)

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This invention relates to an improved device for stabilizing the operating parts of pressure gauges, pressure actuated controllers and similar devices so as to avoid imparting vibratory movements to the movable elements thereof in response to momentary changes in pressure.

The momentary pressure variations or pulsations which are present in many pumping systems make it desirable to provide devices of the above character which will give a correct response to the pressure maintained in the pumping system and at the same time avoid undue oscillations of the moving parts in response to said pressure variations.

Various devices have been heretofore proposed for avoiding the effects of abrupt pressure changes, but they have not been entirely satisfactory because of difficulties encountered in applying the pressure stabilizing element in the gauge or other device and in providing the necessary adjustments to accommodate liquids of different densities. In most instances, the proposed stabilizing devices have included the provision of a single restricting orifice or a restricted passage for damping the pressure impulses exerted on the moving parts of the device. In some instances, the stabilizers have utilized a porous body, for example sand, cotton or wool in connection with a restricting orifice, but these combination devices are equally objectionable since they do not include suitable provisions for altering the effective porosity of the porous body to accommodate liquids of different densities. Furthermore, when a single orifice type of stabilizer is used in a pressure actuated device a partial clogging of the orifice renders the device wholly unreliable.

A principal object of the present invention is to provide a pressure stabilizing device in the form of a rigid porous body which can be readily inserted in and removed from a fluid inlet passage of a pressure actuated device and which can be altered both as to its physical character and its assembled position to accommodate liquids of different densities.

A further and more specific object of the invention is to provide a stabilizing device for use in pressure gauges and similar devices which can be readily made in the form of a hollow porous plug so that its effectiveness can be altered by varying the thickness of the walls of the plug or by adjusting the position of the plug in a part of the gauge so as to increase or decrease the area of the porous surface exposed to the fluid or liquid in the pumping system.

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Other objects and advantages of the invention will appear from the detailed description of the two embodiments shown in the accompanying drawing.

In the drawing:

Fig. 1 is a view of a pressure gauge interposed in a conduit and provided with a stabilizing plug constructed in accordance with this invention and

Fig. 2 is a fragmentary view of the lower portion of the gauge shown in Fig. 1, but showing a modified form of stabilizing plug.

The invention is illustrated in connection with a pressure gauge designated generally by the reference numeral 10. The gauge herein shown is one employing a Bourdon tube 11, but any other known type of pressure gauge may be used. Also the term "pressure gauge" is intended to extend to any device adapted to be interposed in a pressure line or communicate with a body of fluid under pressure so as to function in response to pressure changes in said body.

In the present application, the gauge is provided with a hollow stem 12 which is threaded into a four-way fitting 13 interposed in a conduit 14 containing liquid under pressure. It is to be assumed that the liquid in conduit 14 has a pulsating pressure such as would result when certain types of pumps are used. The stabilizing plug of the present invention is preferably made of porous metal, that is to say, metal granules which have been molded into the desired form and partially fused together. While the use of porous metal is preferred because of its rigidity and simplicity of manufacture, it is possible that material such as ceramics might be used. The porous plug 15 is provided with external threads 16 and screwed into the internally threaded lower portion of the gauge stem 12. The fluid or liquid, as the case may be, will pass from the conduit 14 through the walls of the porous plug into the pressure duct 17 of the gauge. The flow of liquid through the walls of the plug may be controlled in three ways, for example the plug may be made of large or small granules of metal so as to determine the general porosity of the plug. The effective porosity of the plug may also be controlled by varying the thickness of the walls of the plug. This is accomplished by drilling the plug to form a central chamber 18. The thickness of the walls, therefore, can be varied by the use of drills of different diameter. In the embodiment shown in Fig. 1, the chamber 18 opens upwardly into the gauge and is closed at its bottom. This construction makes it practicable to alter the effective area

of the plug which extends into the pressure line 14 by screwing the plug into or out of the channel 17 as may be desired to increase or diminish the flow of liquid through the plug in a given time period. The flow capacity may also be varied by varying the depth of the chamber 18. The porous plug may be inserted into the passage 17 of the gauge before the stem 12 of the gauge is screwed into the pipe fitting 13. However, in order to facilitate ready adjustment of the stabilizing plug, the sections of the duct 14 are preferably connected into the fitting 13 so that the opening 20 of the fitting is opposite the stabilizing plug. Consequently, the stabilizing plug is readily accessible through the opening 20 when the closure plug 21 is removed.

Referring now to the embodiment shown in Fig. 2: The porous plug of this embodiment is designated by the reference numeral 22 and is threaded at its outer end only for threaded engagement in the threaded outer end of the passage 17a in the gauge stem 12a. The lower end of the plug will be normally flush with the lower end of the stem. The central chamber 23 formed in the plug opens into the pressure line, for example into the pipe 13 and the other end is closed. Consequently, the liquid flows from the pressure conduit and fitting 13 upwardly into the hollow chamber 23 of the plug 22 and then passes through the walls of the plug into the pressure passage 17a. Preferably, the external surface of the plug is reduced in diameter so as to provide a suitable clearance passage 24 between the plug and the wall of the pressure passage 17a.

It will be seen that the effectiveness of the modified plug may be varied by reducing the outside diameter so as to reduce the thickness of the walls. The flow capacity of the plug may be fixed during the manufacture by varying the length of the unthreaded portion of the plug or by use of metal granules of various sizes.

I claim:

1. In combination with means defining a passage for containing liquid under pressure and having a portion of constricted cross sectional area, a pressure stabilizer comprising a rigid cylindrical body of porous metal secured in said constricted portion of said passage and adapted to restrict the effective cross-sectional area of said constricted portion of the passage and to restrain transmission through the plug of momentary pulsating pressures; the said plug being formed with surfaces defining a centrally disposed internal chamber which opens through one end portion of the plug to receive liquid therein and the other end portion of the plug being positioned to extend into a portion of said passage having a cross-sectional area larger than the said constricted portion, whereby the liquid permeates laterally through the side wall portion of the plug which extends into said larger cross-sectional area of the conduit, the said constricted portion of the passage being formed with internal screw threads and the external surface of the plug being formed with screw threads for engagement with said internal threaded portion whereby the plug may be adjusted to increase or decrease the area of the plug which extends into the said larger cross-sectional area of the passage and thereby increase or decrease the effective permeable area of the plug.

2. A liquid pressure stabilizing plug comprising a porous cylindrical body formed of sintered metallic granules and provided with surfaces defining a centrally disposed cylindrical cavity formed concentric to the cylindrical outer surface of the body and cooperating with said outer surface to determine the thickness of the liquid permeable walls of the plug, the said cylindrical cavity opening through one end only of the plug whereby the liquid passing through the plug is compelled to permeate through the porous walls thereof, a series of screw threads formed on the outer surface of the plug, and a recess formed at one end thereof for receiving an applying tool.

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