

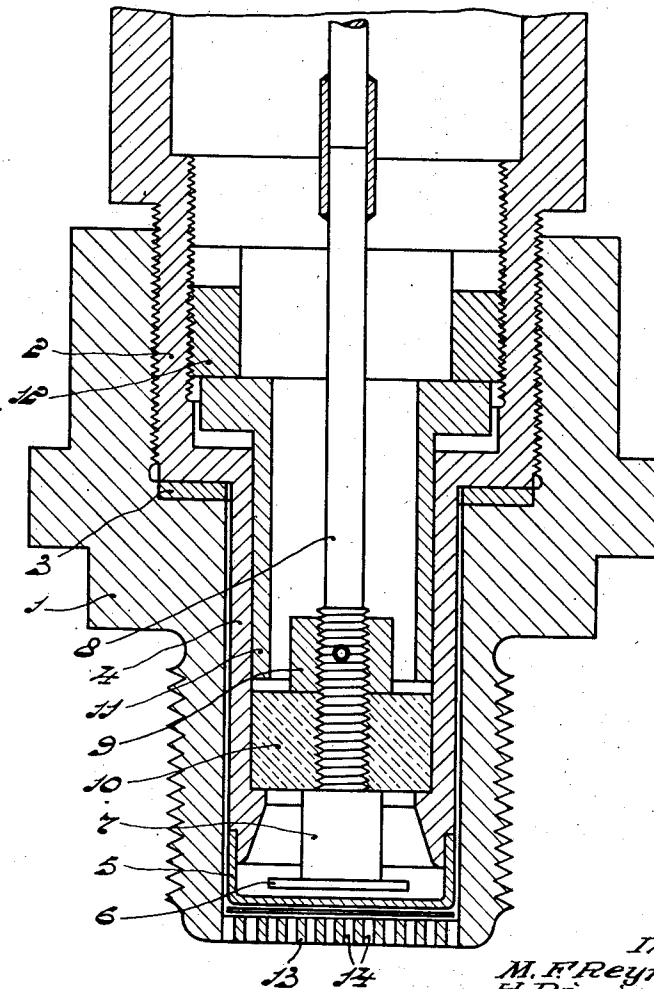
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PRESSURE OBSERVER

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PRESSURE OBSERVER

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5 Claims. (Cl. 177—351)

For pressure measurements use is often made of a diaphragm which is exposed to the pressure to be measured and which constitutes one of the electrodes of a condenser in which the distance between the two electrodes consequently varies with the pressure to be measured.

Usually this condenser is screwed, either directly or set in a holder, into a hole in the wall of the vessel in which the pressure variations must be watched such as, for example, the cylinder portion of an internal combustion engine.

Of course it is desirable that the capacity of the condenser be acted upon solely by the pressure to be measured and, for instance, not also by temperature variations nor by strains set up in the material upon tightening screws.

The present invention provides a construction by which these conditions are satisfied.

According to the invention the diaphragm constitutes the bottom of a cylindrical tube which is freely suspended in a bore of the holder and which makes a tight fit with this holder at the top.

The bore of the holder may be closed by a perforated bottom.

Further particulars of the invention may appear from the following, in which one form of construction of a pressure observer according to the invention is described by reference to the accompanying drawing.

A steel holder 1 has a polygonal, for instance a hexagonal top portion, whereas its bottom portion is furnished with an external screw thread by means of which the holder can be screwed into a wall, for instance a cylinder wall. The holder has an internal cylindrical bore which at the top is wider than at the bottom. The upper wide part is internally provided with a screw thread, in which is screwed a hollow steel cylinder 2 whose bottom portion 4 is so much narrower as to spacedly fit in the lower base of the holder 1, forming between these members a thin annular cylindrical cavity. A shoulder of the cylinder 2 rests on a copper ring 3 together with which it forms a gas-tight closure. At the bottom the cylinder 2 is closed by a diaphragm 5 made from thin special steel and secured by welding. The flat part of this diaphragm coacts with a metal plate 6 closely arranged above the diaphragm forms a condenser whose capacity depends on the prevailing deflection of the diaphragm. The plate 6 is secured to the bottom of a thickened part 7 of a metal shaft 8 on which is slipped a small cylinder 10 of ceramic mate-

rial which by means of a collar 9 and a set screw is kept pressed against the thickened part 7. The cylinder 10 fits in the bore of cylinder 4 and is pressed at the bottom against a re-entrant edge of this cylinder by means of a thrust piece 11 and a ring 12 screwed into the cylinder 2.

For reasons stated hereinafter the bore in the holder 1 does not extend to the bottom, but there is left a wall 13 having a thickness of several millimetres in which are provided a number of perforations 14. Obviously the distance between the parts 5 and 6 is entirely independent of the force with which the holder is screwed into the wall of the cylinder, but also of the force with which the cylinder 2 is fastened and tightened in the holder. A suitable choice of the material of parts 4, 5, 6 and 7 results in that the air-gap between 5 and 6 does not change on the occurrence of temperature variations.

When the pressure observer is used on the cylinder portion of an internal combustion engine in which, of course, high temperatures occur provision must be made for sufficient cooling of the diaphragm and/or for adequate protection thereof against the hot gases. Cooling can be promoted by coating the parts 4 and 5 with a layer or foil of a metal of high thermal conductivity such as copper or silver. Protection of the diaphragm from the hot gases is primarily afforded by the perforated wall 13 and in addition, if required, by inserting one or more mica plates between the said wall and the diaphragm 5.

We wish it to be understood that we do not desire to be limited to the exact details of construction and design shown and described as various modifications of the invention within the scope of the appended claims may occur to a person skilled in the art.

What we claim is:

1. A device for measuring variations in pressure of a fluid within a container, comprising a housing provided with a bore exposed to the fluid, means comprising a portion of said housing to secure the same to the container, and a pressure-actuated mechanism comprising a casing positioned within and spaced from the surface of said bore adjacent to said securing means and a pressure-actuated diaphragm member closing one end of said casing and adapted to be acted upon by the fluid, said casing being secured to said housing at a portion remote from said diaphragm and outside the vicinity of said securing means to thereby preclude distortion of said dia-

phragm by stresses applied to the securing means of the housing and of the casing.

2. A device for measuring variations in pressure of a fluid within a container, comprising a metal housing provided with a central bore exposed to the fluid, means comprising a threaded end portion of said housing to secure the same to the container, and a pressure-actuated mechanism comprising a tubular metal casing positioned within said bore and spaced from the surface thereof at a portion adjacent to said threaded portion, a pressure-actuated diaphragm-shaped electrode closing one end of the casing and having an outer surface adapted to be acted upon by the fluid, and a counter electrode positioned within said casing adjacent to the inner surface of said diaphragm-electrode, said casing being secured to said housing at a portion remote from said diaphragm and outside the vicinity of said threaded portion to thereby preclude distortion of said diaphragm by stresses applied to the said threaded portion and to the securing means of said casing.

3. A device for measuring variations in pressure of a fluid within a container, comprising a housing provided with a bore having one end thereof exposed to the fluid, a perforated wall portion covering the said end of the bore, means comprising a portion of said housing to secure the same to the container, and a pressure-actuated mechanism comprising a casing positioned within and spaced from the surface of said bore at a portion adjacent the securing means of the housing and a pressure-actuated diaphragm member closing one end of the casing positioned adjacent to and spaced from said perforated wall portion, said casing being secured to said housing at a portion remote from said diaphragm and outside the vicinity of said securing means to thereby preclude distortion of said diaphragm by stresses applied to the securing means of the housing and of the casing.

4. A device for measuring variations in pressure of a fluid within a container, comprising a housing provided with a bore having one end

thereof exposed to the fluid, a perforated wall portion covering the said end of the bore, means comprising a portion of said housing to secure the same to the container, and a pressure-actuated mechanism comprising a casing positioned within and spaced from the surface of said bore at a portion adjacent to the securing means of the housing, a pressure-actuated diaphragm member closing one end of said casing positioned adjacent to and spaced from said perforated wall portion, and a layer of a material of high thermal conductivity forming a coating on the surface of said electrode, said casing being secured to said housing at a portion remote from said diaphragm and outside the vicinity of said securing means to thereby preclude distortion of said diaphragm by stresses applied to the securing means of the housing and of the casing.

5. A device for measuring variations in pressure of a fluid within a container, comprising a housing provided with a bore having one end thereof exposed to the fluid, a perforated wall portion covering the said end of the bore, means comprising a portion of said housing to secure the same to the container, a pressure-actuated mechanism comprising a casing positioned within and spaced from the surface of said bore at a portion adjacent to the securing means of the housing and a pressure-actuated diaphragm member closing one end of the casing positioned adjacent to and spaced from said perforated wall portion, and a heat-resistant baffle member interposed between said diaphragm member and the perforated wall, said casing being secured to said housing at a portion remote from said diaphragm member and outside the vicinity of said securing means, to thereby preclude distortion of said diaphragm by stresses applied to the securing means of the housing and of the casing.

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