

F. E. WOLF.
DIFFERENTIAL MANOMETER.
APPLICATION FILED JULY 11, 1911.

1,074,306.

Fig. 1

Patented Sept. 30, 1913.

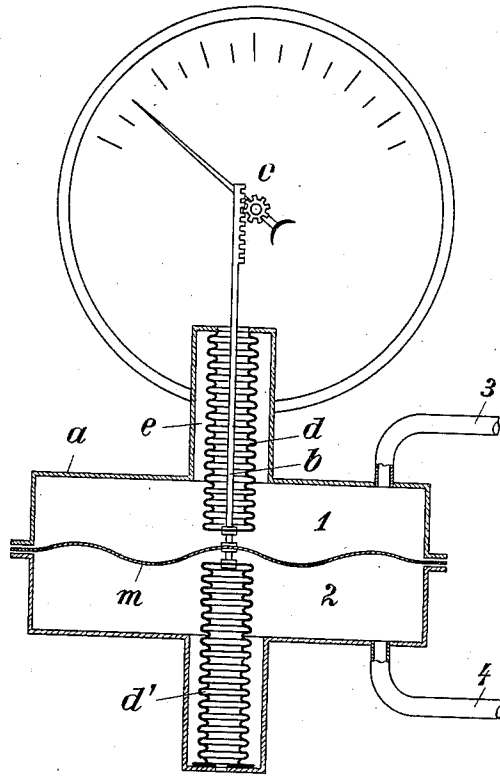
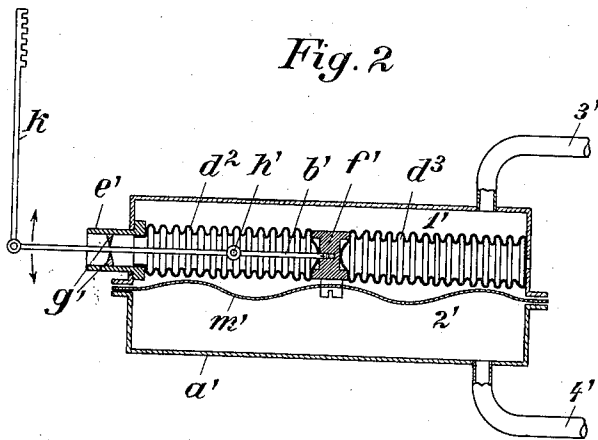


Fig. 2



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DIFFERENTIAL MANOMETER.

1,074,306.

Specification of Letters Patent.

Patented Sept. 30, 1913.

Application filed July 11, 1911. Serial No. 637,860.

To all whom it may concern:

Be it known that I, FRANZ EMIL WOLF, engineer, a subject of the King of Prussia, residing at Nowawes, near Potsdam, in the Kingdom of Prussia and Empire of Germany, have invented certain new and useful Improvements in Differential Manometers, of which the following is a specification.

My invention relates to improvements in differential manometers by means of which the difference of the pressure of two fluids or of the same fluid at different parts of a conduit or the like can directly be ascertained. And the object of the improvements is to provide a differential manometer in which inaccuracies such as are caused by friction of the operative parts and by untightness of the pressure chambers are avoided. As is known in the art in manometers of this class the elastic member ordinarily in the form of a diaphragm which is exposed to the pressures of both fluids must be connected with a suitable indicating device, and in manometers such as are now in use the connecting member is guided in a stuffing box which causes friction whereby the regular displacement of the diaphragm is impaired, and the pressure within the pressure chambers is subjected to changes by the escape of fluid through the stuffing box.

My invention consists in rigidly and tightly securing the said connecting member to the wall of the casing, and to form the part of the wall to which the connecting member is secured of highly elastic material, so that it follows the displacements of the connecting member without opposing any resistance thereto. And in the preferred form of the invention the part of the wall of the casing to which the connecting member is secured is constructed in the form of a very elastic tube which at an open end is tightly secured to the casing and at its opposite closed end is secured to the connecting member.

In order that my invention may more clearly be understood two examples embodying the same have been shown in the accompanying drawing in which—

Figure 1, is a vertical cross-section of the apparatus, and Fig. 2, is a vertical cross-section of a modification of the apparatus.

Referring to the example illustrated in Fig. 1, the apparatus consists of a casing *a* which by a diaphragm *m* is divided into two chambers 1 and 2 respectively connected by

conduits 3 and 4 with the fluids of different pressures, or with different parts of a fluid chamber. To the diaphragm a rod *b* is secured by means of which the displacements of the diaphragm are transmitted to a suitable indicating device which in the drawing has been represented by a hand *c*. The said rod extends through a tube *d* or pocket which with its open outer end is soldered or otherwise secured to a stud *e* projecting from the casing, and which is closed at its inner end. This pocket *d* forms an elastic part of the wall of the casing *a* and may indeed be regarded as a sort of second diaphragm. The rod *b* extends through the closed inner end of the tube *d* and it is tightly secured thereto. The tube *d* is highly elastic so that it yields to any pressure exerted thereon by the diaphragm through the rod *b*. In the example shown in the drawing the said tube is made elastic by having its wall provided with suitable depressions, and in the preferred form the tube is undulated. By reason of its connection with the elastic tube *d* through the rod *b* the operative surface of the diaphragm is reduced by an amount which is equal to the cross-section of the rod. In order to avoid an error in the measurement, I prefer to provide a similar tube *d'* arranged in chamber 2 symmetrically placed at the opposite side of the diaphragm and connected thereto by a rod having the same cross-section as the rod *b*, so that the active surface of the diaphragm on the side of the chamber 2 is reduced by a corresponding amount.

In the example shown in Fig. 2 the casing *a'* is likewise provided with a diaphragm *m'*, whereby the casing is divided into two chambers 1' and 2' connected respectively with the fluid supplies through the conduits 3' and 4'. As shown the elastic tube *d*² and the connecting rod *b'* located therein are disposed parallel to the plane of the diaphragm, and the rod *b'* is connected with the diaphragm by a block *f'*. Near its outer end and within a stud *e'* to which the tube *d*² is soldered or otherwise secured the rod *b'* is fulcrumed between a pair of edges *g'*. At its outer end the rod *b'* is connected to a lever *h* formed at its upper end as a toothed rack adapted to engage a pinion of the indicating mechanism. To permit the rod *b'* to freely rock about the fulcrum *g'* it is provided with a suitable joint *h'* which in the example shown is located at a point

near the block f' . Also in this case a second elastic tube d^3 may be arranged symmetrically to the tube d^2 , whereby undue strains on the diaphragm are avoided.

5 I claim herein as my invention:

1. A differential manometer comprising a casing-wall a part of which is readily yielding; a diaphragm which is mounted within said casing-wall and which forms therewith
10 a pair of fluid-pressure chambers, said wall being formed with openings one in each of said chambers, for the fluid; a pressure indicator; and a connector which connects said diaphragm and indicator and transmits the
15 movements of the diaphragm to the indicator and which is fastened to and extends through the yielding part of said wall.

2. A differential manometer comprising a casing-wall a part of which is in the form
0 of an elastic pocket; a diaphragm which is mounted within said casing-wall and forms therewith a pair of fluid-pressure chambers, said wall being formed with openings one in each of said chambers, for the fluid; a
1 pressure indicator; and a connector which connects said diaphragm and indicator and transmits the movements of the diaphragm

to the indicator and which is fastened to the bottom of said elastic pocket and extends therethrough.

3. A differential manometer comprising a casing-wall a part of which is in the form of an elastic pocket; a diaphragm which is mounted within said casing-wall and forms
35 therewith a pair of fluid-pressure chambers, said wall being formed with openings one in each of said chambers, for the fluid; a pressure indicator; a connector which connects said diaphragm and indicator and transmits the movements of the diaphragm
40 to the indicator and which is fastened to the bottom of said elastic pocket and extends therethrough; and a second elastic pocket arranged symmetrically with respect to the
45 first-named pocket and attached to said diaphragm on the side thereof opposite from the first-named pocket.

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

FRANZ EMIL WOLF.

Witnesses:

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PAULINE KLAIBER.