April 28, 1931. W. C. HOPKINS 1,803,255

PRESSURE GAUGE ATTACHMENT

Filed Oct. 18, 1928

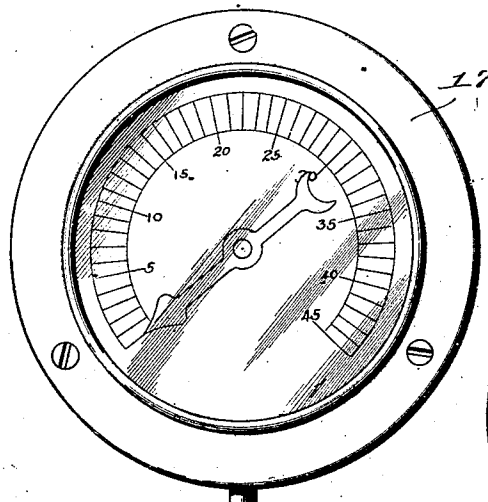



Fig. 1.

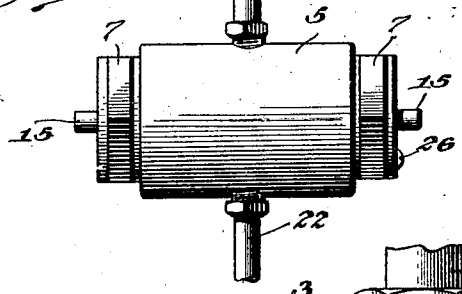



Fig. 3.

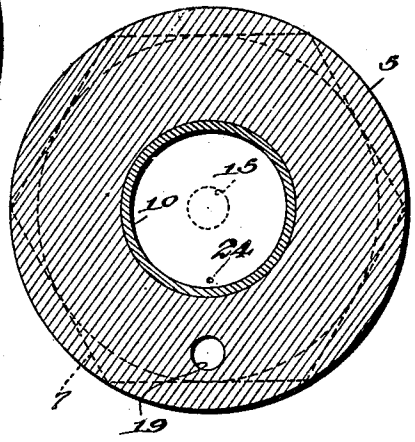



Fig. 4.

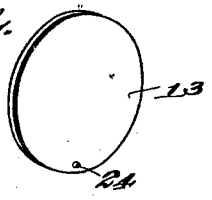
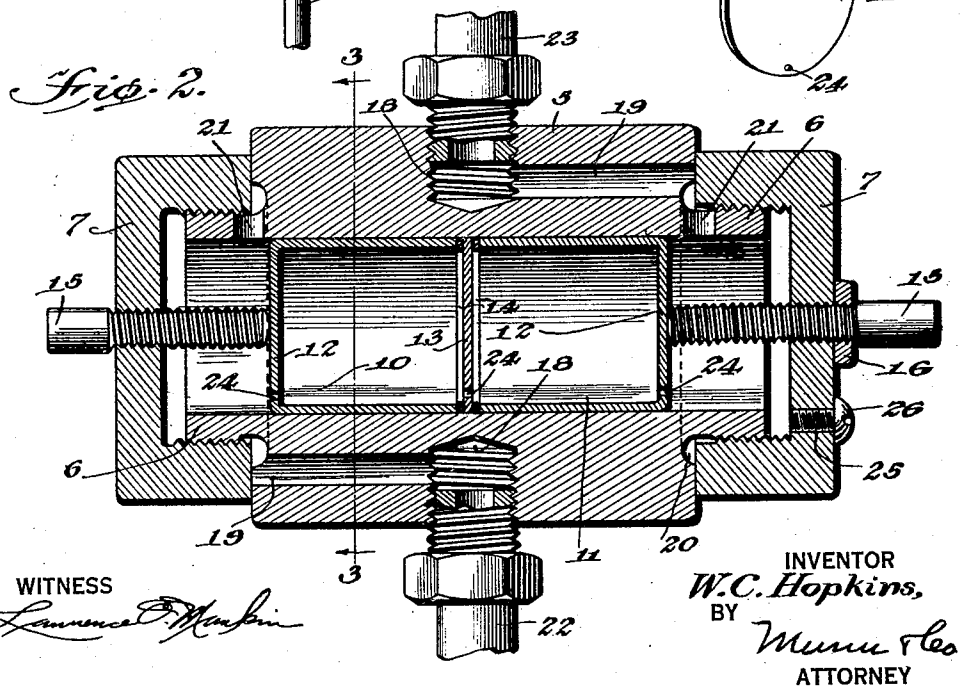



Fig. 2.




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# UNITED STATES PATENT OFFICE

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## PRESSURE-GAUGE ATTACHMENT

Application filed October 18, 1928. Serial No. 313,274.

My invention relates to pressure gauges, and more particularly to an attachment for preventing pressure fluctuations in the gauge.

An object of the invention is to provide a device for damping pressure variations from a pressure source so as to give a correct reading of the pressure indicating hand.

Further the invention provides a device of this character whereby a variable pressure will be changed into a constant one and thereby reduce strain on the interior mechanism of a pressure gauge to a minimum.

With the preceding and other objects and advantages in mind, the invention consists in the novel combination of elements, constructions and arrangement of parts to be hereinafter specifically referred to, claimed and illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of my invention associated with an air pressure gauge.

Figure 2 is a vertical longitudinal sectional view of the attachment.

Figure 3 is a transverse section taken on line 3—3 of Figure 2.

Figure 4 is a perspective of one of the elements embodied in my invention.

Referring to the invention in detail, a cylinder 5 having relatively thick walls is provided. At its opposite ends, the cylinder is formed with reduced exteriorly threaded portions 6 which receive interiorly threaded caps or closures 7. For the purpose of dividing the cylinder into a plurality of liquid containing compartments, a pair of cylinders 10 and 11 each having an end wall 12 is received within the cylinder with their open ends opposed. A disk 13 is held between the open ends of the cylinders. To establish a seal between the cylinders 10 and 11 and the disk 13, annular packing elements 14 are interposed between the adjacent ends of these cylinders and the opposite faces of the disk 13.

In order to hold the cylinders against movement within the cylinder 5 and to maintain them in proper adjustment, adjusting screws 15 pass centrally through the cap 7 and have threaded engagement therewith. At their inner ends, these screws bear against the end walls of the cylinders. A lock nut 16 is associated with one of the screws for securing the latter in adjusted position.

It will be observed that the end walls 12, disk 13, and cap 7 define a plurality of compartments for receiving heavy liquid such as oil through which compressed air is caused to pass before it enters the usual air gauge 17.

Threaded recesses 18 are formed in the cylinder at diametrically opposite points and centrally of the cylinder ends. Oppositely extending longitudinal bores 19 are also formed in the cylinder, each of which communicates with one of the recesses 18 and opens upon one end of the cylinder. At their outer ends, these bores communicate with annular grooves 20 provided in the ends of the cylinder and the reduced ends 6. Communication is established between the longitudinal bores and the interior of the cylinder by way of transverse ports 21 provided in the reduced ends 6 at the inner ends of the latter.

An air supply pipe 22 leading from a suitable pressure source is threadedly engaged with the opening 18 while an air gauge inlet pipe 23 is threaded into the other opening 18.

Air pressure is permitted to slowly pass through the cylinder and enter the air gauge 17 by way of longitudinally alined bleed ports 24 provided in the end walls 12 and disk 13. These bleed ports 24 are located a considerable distance below the ports 21 so that it will be necessary for the air pressure to pass through substantially the entire depth of the liquid contained in the compartments. In practice, the cylinder is entirely filled with heavy oil or other suitable liquid through a filling opening 25 in one of the caps 7. A closure in the form of a set screw 26 normally closes the filling opening.

It will be apparent that incoming air pres-

sure flows into the cylinder through one of the ports 21, continues in a longitudinal direction and passes into the gauge 17 by way of the other port 21. It will be observed that air pressure entering the cylinder displaces some of the liquid from each of the compartments in succession. A sufficient amount of liquid remains in each compartment as to cover the bleed ports 24 so that all of the compartments will always contain air pressure. When the pressure from the pressure source rises suddenly the air in the compartments is compressed and thereby absorbs most of the shock from the raised pressure. Due to the fact that the air must pass successively through the compartments the shock is gradually damped out so that the pressure finally entering the gauge will be constant. In other words, the interpositioning of a liquid column between the source of pressure and gauge will change a variable pressure to a constant one and consequently prevent the pressure indicating hand of the air gauge from vibrating. Furthermore this changing of a variable pressure into a constant one will eliminate wear on the mechanism of the air gauge by eliminating vibration.

What is claimed is:

1. In a pressure damping device, a cylinder having reduced ends provided with annular grooves and transverse ports communicating with the interior of the cylinder, caps received on the reduced ends of said cylinder, a plurality of transverse partitions in the cylinder, each partition having a bleed port, said partitions and said caps defining a plurality of liquid holding chambers, means for connecting one of said grooves with a source of pressure, and means for connecting the other groove with a pressure gauge.

2. In a pressure damping device, a cylinder having reduced ends provided with annular grooves and transverse ports communicating with the interior of the cylinder, caps received on the reduced ends of said cylinder, a plurality of transverse partitions in the cylinder, each partition having a bleed port, said partitions with said caps defining a plurality of liquid holding chambers, means for connecting one of said grooves with a source of pressure, means for connecting the other groove with a pressure gauge, and cooperating means between the caps and adjacent partitions for holding all of the partitions in place.

3. In a pressure damping device, a cylinder having reduced ends provided with annular grooves and transverse ports communicating with the interior of the cylinder, caps received on the reduced ends of said cylinder, a plurality of transverse partitions in the cylinder, each partition having a bleed port, said partitions with said caps defining a plurality of liquid holding chambers, means for connecting one of said grooves with a source of pressure, means for connecting the other groove with a pressure gauge, and screws passing transversely through said caps and bearing against the outermost partition to maintain all of the partitions in place.

4. In a pressure damping device, a cylinder having reduced ends provided with annular grooves and transverse ports communicating with the interior of the cylinder, the cylinder walls being further provided with longitudinal bores, each of which communicates with one of the grooves, means for connecting one of the bores with a source of pressure, means for connecting the other bore with a pressure gauge, transverse partitions in the cylinder, each having a bleed port, and removable caps received on the reduced ends of the cylinder and with said partitions defining a plurality of liquid holding chambers.

5. In an air pressure damping device, a cylinder having reduced ends provided with annular grooves and transverse ports communicating with the interior of the cylinder, the cylinder being further provided with longitudinal bores each of which communicates with one of the grooves, means for connecting one of the bores with a source of compressed air, means for connecting the other bore with an air pressure gauge, transverse partitions in the cylinder for defining a plurality of liquid holding chambers, each partition having a bleed port through which air must pass before entering the gauge, removable caps received on the reduced ends of the cylinder, and screws adjustable through the caps and engaging the endmost partitions.

6. In an air pressure damping device, a cylinder having reduced ends provided with annular grooves and transverse ports communicating with the interior of the cylinder, the cylinder being further provided with longitudinal bores each of which communicates with one of the grooves, means for connecting one of the bores with a source of compressed air, means for connecting the other bore with an air gauge, a plurality of cylinders arranged in the first mentioned cylinder each having an end wall provided with a bleed opening, caps received on the ends of the first mentioned cylinder and with the end walls of the last mentioned cylinders defining a plurality of liquid holding compartments.

7. In an air pressure damping device, a cylinder having reduced ends provided with annular grooves and transverse ports communicating with the interior of the cylinder, the cylinder walls being further provided with longitudinal bores each of which communicates with one of the grooves, means for connecting one of the bores with a source of compressed air, means for connecting the other bore with an air gauge, a plurality of

cylinders arranged in the first mentioned cylinder each having an end wall provided with a bleed opening, caps received on the ends of the first mentioned cylinder and with the end walls of the last mentioned cylinders defining a plurality of liquid holding compartments, and screws threadedly engaged with the caps and at their ends engaging the last mentioned cylinders to hold them in position.

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