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2,344,943

ADJUSTABLE RESISTOR FOR FLOWMETERS

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Fig. 1.

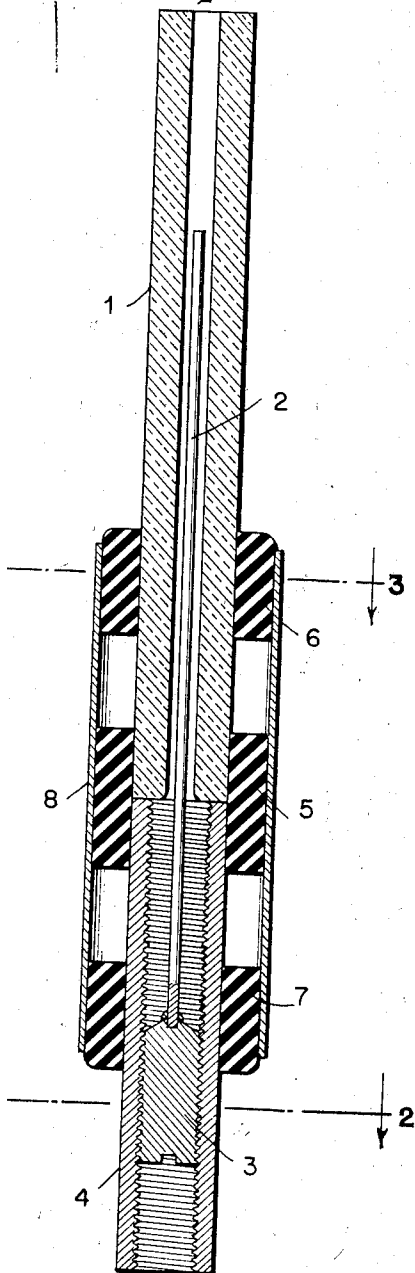


Fig. 3.

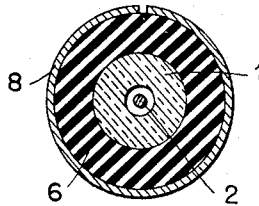
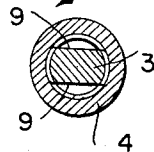


Fig. 2.



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ADJUSTABLE RESISTOR FOR FLOWMETERS

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Claude R. Wickard, as Secretary of Agriculture
of the United States of America, and his suc-
cessors in office

Application August 10, 1942, Serial No. 454,251

1 Claim. (CL 138—45)

(Granted under the act of March 3, 1883, as
amended April 30, 1928; 370 O. G. 757)

This application is made under the act of March 3, 1883, as amended by the act of April 30, 1928, and the invention herein described and claimed, if patented, may be manufactured and used by or for the Government of the United States of America for governmental purposes, without payment to me of any royalty thereon.

This invention relates to flowmeters. Flowmeters for measuring the rate of flow of fluids are commonly provided with a resistor through which the fluid passes. A pressure gauge, so connected as to measure the pressure drop across the resistor, serves, when suitably calibrated, to determine the rate of flow. A capillary tube is commonly employed as a resistor and, in some cases, a wire is inserted in the tube to raise the resistance to the desired amount. Where high precision is necessary, it is difficult to predetermine accurately the length of wire required. Even when the resistance is once properly adjusted, the adjustment is subject to failure due to variability of alignment of the wire within the capillary tube.

An object of my invention is to provide a resistor for flowmeters whose resistance may be conveniently adjusted to a precise value. More specifically, the object of this invention is to improve the manner of using a wire for the above purpose in such a way as to provide a fine adjustment mechanism for regulating the resistance of the resistor. Another object of the invention is to provide an improvement in joints.

In the accompanying drawing, in which similar numerals refer to similar parts throughout the views:

Figure 1 is a longitudinal section of the resistor,

Figure 2 is a cross section of a line 2—2 of Figure 1, and

Figure 3 is a section on a line 3—3 of Figure 1.

The required resistance is effected by capillary tube 1, formed of suitable material, such as glass, and containing a wire or wire shaped member of smaller cross-sectional area than that of the bore of the tube. This wire extends through less than the whole length of tube 1 and protrudes therefrom at one end. The effective length of the wire in the tube is controlled by adjusting the extent of its insertion therein. For this purpose, the protruding end of wire 2 is fixedly attached to an adjusting screw 3, which fits inside an internally threaded mounting means in the form of a tube 4 formed

of suitable material, such as metal. Adjusting screw 3 is formed with flattened opposite sides 9—9 to effect a by-pass for the fluid. The tube 4 is attached fluid tight to capillary tube 1 and forms an extension thereof.

Tube 4 must be attached to tube 1 with a reliable leak proof joint and this is simply accomplished by a short piece of tubing 5 of resilient material, such as rubber, surrounding the two tubes 1 and 4 at their junction. Two other pieces of such tubing 6 and 7 surround the tubes 1 and 4, respectively, at short distances from the junction. A split tubular member 8 of springy material, such as springy sheet steel, surrounds rubber tubes 5, 6 and 7 and grips them firmly. Member 8, therefore, has bearing on both tubes 1 and 4 at points remote from their junction as well as at an intermediate point. This makes the joint rigid, acting as a splint, thus preventing bending of the joint at tube 5 with consequent disturbance to the adjustment of wire 2.

The preferred manner of adjusting the resistor is as follows: The resistor is originally constructed to have approximately the desired resistance when the adjusting screw 3 is longitudinally centered within the threaded tube 4. It is first tested with screw 3 approximately so centered. If the resistance found is less or more than the required amount, screw 3 is rotated so as to extend wire 2 respectively farther or less far into the capillary tube 1. A second test is then made. Similar procedure is continued until the resistance found agrees with that specified for the proper performance of the flowmeter. Should the adjustment ever become faulty, similar adjusting procedure can be followed.

Having thus described my invention, I claim:

In a flowmeter, a fluid flow resistor comprising a capillary tube, a wire of smaller cross-sectional area than that of the bore of the tube, having one end extending into the tube for increasing its resistance to flow and having its other end protruding from the end of the tube, an internally threaded tubular mounting means positioned adjacent to and in alignment with the end of the capillary tube from which the wire protrudes, an adjusting screw having a fluid by-pass fixedly attached to the end of the wire and threaded into the mounting means for adjusting the length of wire extending into the tube, and means joining the tubular mounting means fluid tight to the capillary tube.

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